

INDUSTRIAL-ARTS MAGAZINE

Incorporating: HANDICRAFT and the ARTS AND CRAFTS MAGAZINE

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TABLE OF CONTENTS

Vol. VI	SEPTEMBER, 1917	No. 9
An Experiment in a Co-operative Power Machine Class, <i>George C. Greener</i>		Page 343
A Flag Seated Chair, <i>S. C. Roberts</i>		351
Training of Girls and Women for Trade and Industry, <i>Mary Schenck Woolman</i>		355
Applied Art in Window Decorating, <i>E. D. Hansen</i>		356
Jigs in Bench Metal Work, <i>Roger W. Hastings</i>		357
Teaching Lettering in the Common Schools, <i>Rodney S. Brace</i>		359
A New Process—Waste Wax Castings for Jewelry, <i>Louis J. Haas</i>		361
Practice Teaching at the Stout Institute, <i>R. H. Rodgers</i>		366
The Reminiscences of a High School Drawing Teacher, <i>Maud M. Miles</i>		370
Period Styles in Furniture, <i>Conrad Weiffenbach and Anton Anderson</i>		373
Editorial.....		374
The Portland Convention of the N. E. A.....		376
Problems and Projects—		
Magazine Stand, <i>L. Day Perry</i>		379
Hunting Axe Problem as Forged in Hibbing Schools, <i>J. F. Knowlton</i>		379
A Home Dryer for Fruit, <i>Frank H. Shepherd</i>		381
A Hose Reel, <i>Francis E. Mack</i>		382
Drawing Model Stand, <i>Leslie G. Martin</i>		384
Holder for Ink Bottle, <i>A. J. Conradt, Jr.</i>		384
Now, Are There Any Questions?.....		384
News and Notes from the Field.....		XVIII
New Books.....		XXIX
Official Publications of Interest.....		XXIX
News of the Industrial Arts Trade.....		XXXIII
Personal News Notes.....		XXXIV

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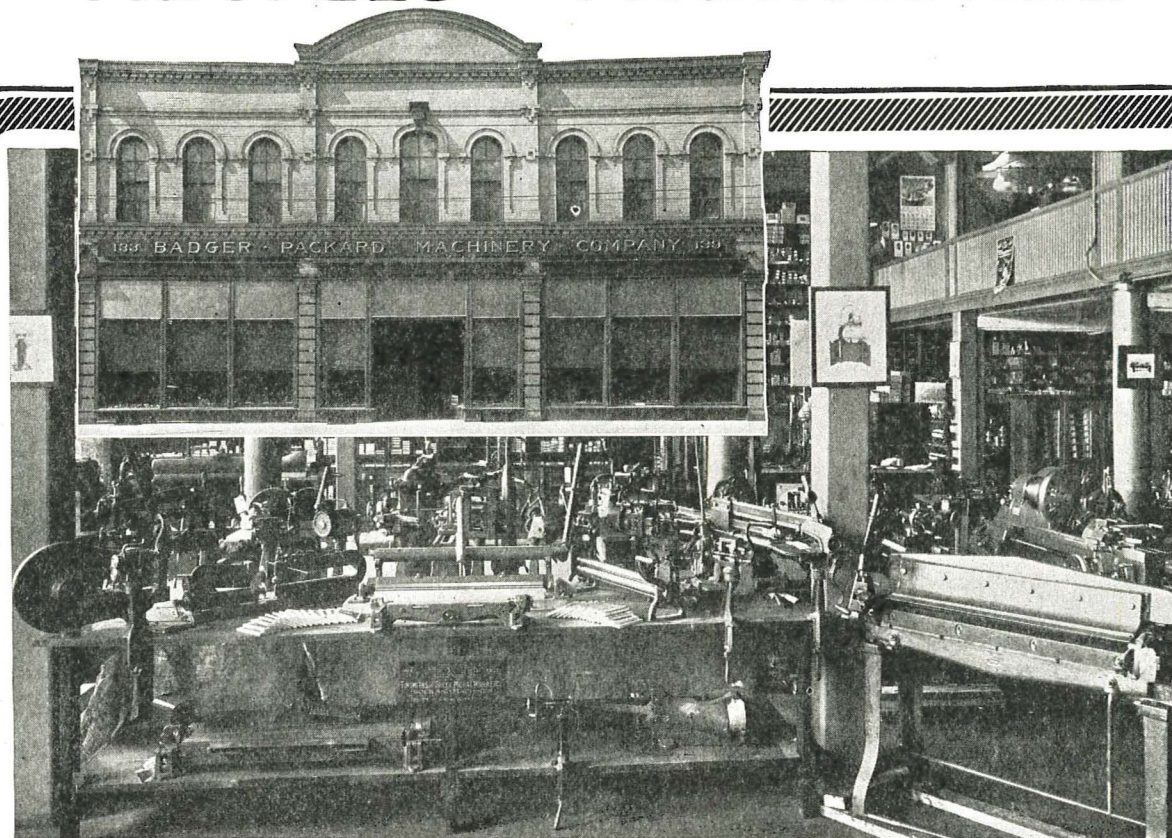
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AN EXPERIMENT IN A CO-OPERATIVE POWER MACHINE CLASS

George C. Greener, Director, North Bennet Street Industrial School,
Boston, Massachusetts



MOST people are aware, in a general way, that the ordinary public school curriculum, which is designed solely to prepare children for higher academic work, fails to meet the needs of the vast majority of children, who never even reach the high school. Yet few people realize the full significance of the statement that, of 1,000 children who enter the public schools each year, 960 do not succeed in completing the grammar school course. This vast group of children leave school to enter industry wholly unprepared for any definite kind of work. A handful of them are fortunate enough to land in skilled trades, but by far the greater number are forced by necessity into the lowest grade of routine factory work. So long as the public schools fail to prevent this wholesale departure for the already over-crowded ranks of unskilled labor, they are failing to assume their full responsibility toward 96 per cent of their pupils.

Experiments in Vocational Education.

Boston was one of the first cities in the country to establish a public trade school and to foster experiments in vocational education by private institutions. The North Bennet Street Industrial School, founded in 1881, has long served the city as an educational experiment station. It is situated in one of the most densely populated districts, the historic North End. In the typical family life of the neighborhood, "working papers" play a vital role. The children of the family, girls and boys alike, usually go to work under the age of sixteen. There is, in consequence, a permanent need of specific training looking to profitable and wholesome employment and an equal need of guidance toward true American ideals of citizenship.

As one step toward meeting this need, the North Bennet School carries on, with the co-operation of the public school authorities, prevocational classes for boys and girls under the age of fourteen. These classes offer a modification of the upper grammar school course for those who must leave school early to go to work or who have fallen behind in purely academic courses. The Vocational Guidance and Placement Bureau was instituted for the purpose of securing to these pupils, in greater or less degree, the permanent value of their educational training by helping them to continue that training or to get a proper start in industry. The usefulness of the

prevocational classes led to their extension, while the combination of this work with the placement work helped to define more clearly a further need not entirely met by either of the foregoing activities.

Vocational Scholarships for Girls.

In the Fall of 1915, the school took up a problem which is familiar to all teachers and social workers in congested city districts as one of the most widespread and also as one of the most baffling. This is the problem of the young girl between fourteen and sixteen who feels the necessity of going to work because of the economic pressure at home, but who is wholly untrained. She cannot possibly afford to go to school—either to the trade school or to the high school. These girls come from families which cannot even provide them with adequate maintenance while their schooling is continued. They are forced to earn at least enough for their own support. At the same time, skilled industry has no place for such immature and untrained workers. In a highly organized industry, they have no economic value. Only in the most unskilled occupations do they find a welcome.

Graduating from our prevocational class, there are usually twenty girls, half of whom, thru some sacrifice on the part of their parents, are enabled to go to the public trade school; but the other half are forced to discontinue their school training in order to add to the family income. It happens in the North End of Boston that the unskilled jobs for which alone these girls are eligible exist mainly in the candy factories, and it is here that the fourteen or fifteen-year-old girl of the neighborhood finds practically her only chance at wage-earning. We were unwilling to accept this condition of things as a matter of course for the majority of the girls of our district.

In view of these circumstances, the school decided that the only practical measure was to provide some sort of definite training and to pay a small stipend, in the nature of a scholarship, to the girls who took the course. This is an attempt, in a small way, to overcome two difficulties; first, that of keeping the girl under training until she is old enough to be accepted as a worker in a skilled trade; and, second, that of making the parents content to have the girl remain in the class long enough to acquire the requisite amount of skill. It was also thought that such scholarships would serve as a direct demon-

stration to parents of the idea that immediate employment at the first job at hand is not the best way to become a competent wage-earner in the future. And, finally, there are still manufacturers who need to be convinced of the value of preparatory industrial training.

To carry out this plan for combining vocational training with the payment of a stipend, it was necessary to settle two important points at the outset: What sort of training should they be given, and how much should the girls be paid?

Kind of Training.

The first point to be settled was, What sort of training should be given? This problem presented difficulty. In selecting the trade to be taught, it was necessary to find an occupation for which we could train girls from fourteen to sixteen years of age to enter the skilled trades. It was necessary to consider whether this occupation offered a permanent, if not a growing, demand for workers, whether it offered the possibilities of skilled work at good wages, and whether it was sufficiently free from seasonal fluctuations to afford regular employment for most of the year. The occupation which admitted of the most favorable answer to all these questions was the garment-making trade. Altho we were repeatedly told that Italians would not go into the needle trades, we were determined to make the effort. A class in power machine operating would, without doubt, open up the most numerous opportunities for the largest number of capable girls. It was, however, necessary to ascertain if such training in power machine operating would enable a girl to do better work, thus making her of greater economic value to the employer and hence able to demand higher wages.

Fully a year was spent in preparatory investigation before the class was actually launched. Manufacturers in every instance were willing to give advice from their experience. Educators responded freely with suggestions and plans. A special investigation made in the Spring of 1915, by Miss Cleo Murtland, assistant secretary of the National Society for the Promotion of Industrial Education, brought out a number of facts concerning the factory needle trades of Boston which were of great importance for the proposed vocational work.

Opportunities in the Needle Trades.

This study showed that home dressmaking is being absorbed by the factory trade at an amazing rate. Almost nothing is left of the old custom trade except in the very exclusive, expensive, and fashionable shop. The growth of the industry is sufficiently evidenced by the increasing number of machine-made garments in the stores. Statistics bear out this evidence of increase. The Ladies' Garment Manufacturing Association of Boston reported that in 1907 the amount of wages paid was \$1,097,042; in 1913, the amount was \$2,104,384. The increase in six years was 95 per cent. The association further re-

ported that the number of wage earners in 1907 was 2,267, and, in 1913, it was 3,762. The net increase was 65 per cent. These percentages show that there is not only an increasing demand for workers but also an increased rate of wages for those engaged in the industry, both of which are evidences of wholesome growth. Added to this is the fact that the number of factories engaged in garment work is also increasing. It is probable that the garment factories of Boston could take care of five hundred trained workers a year.

Concerning the length of the working year, Miss Murtland found that there still exist in the industry two seasons of much work and great pressure; but that the working year is increasing, thus spreading out the earnings of the workers engaged in the industry. To some extent, alternation of work in various branches of the industry makes constant employment possible. Manufacturers have insisted that they prefer workers to be trained in the various processes of construction of garments rather than to draw their recruits from those who had been highly trained in only one process. Training the worker in adaptability is of extreme importance.

Policy of Payment.

To enable the pupils to dispense with wage-earning, it was necessary to pay them a sum which would approximate what they could earn at unskilled work outside. At the same time, the pupils spend but half the day in the workshop, which places them on the footing of half-time workers, and, therefore, of half-time earners. It was decided, after carefully weighing the matter, that two dollars a week was the minimum sum which could be offered if the burden of the daughter's support was to be appreciably lifted from the shoulders of the other wage earners of the family.

After one week of preliminary training, the girls are started with an allowance of two dollars a week, receiving that amount until an advance is recommended by the teacher. The increases are made at the rate of 25 per cent until the maximum of three dollars has been reached.

While it is felt that these sums are not high, it is unfortunately true that they compare very favorably with the rate at which girls of this age are rewarded for the unskilled work. So long as wages are what they are, it is, for obvious reasons, undesirable that the school stipend should be made larger than the commercial wage. It is desirable, however, that it shall cover, as nearly as possible, the daughter's share of what it costs the family to live and thus alleviate the economic pressure at home which would otherwise make wage-earning compulsory for her.

Equipment.

Before the idea of the class became a reality, the subject of equipment was carefully considered. Valuable suggestions and advice came from manufacturers and business men. As there are 150 different

types of power machines, it was a matter of great importance to choose the right one—the one which would do best the kind of work we wished to do and which would furnish the all-round operating experience of so much practical value to the girl when she should leave the class. The machine finally chosen was the Singer 61-W for sewing light and medium materials at high speed, with perfect tension and strong elastic stitch. The machine is designed especially for power operation at high speed. It is built in two sizes, viz: "Long Arm" and "Short

chines practically as good as new. This method of economy may easily be imitated by those who have in mind the establishment of a power-machine class. Second-hand machines in first class condition are usually on the market, the equipment of firms which have gone out of business or have replaced their machinery with the more up-to-date models.

The task of raising the necessary capital to launch the enterprise, which might otherwise have proved to be an extremely difficult one, was for us made easy by the generosity of four friends, who



Girls' Power Machine Class, North Bennet Street Industrial School, Boston, Mass.

Arm," the former having a bed-plate $17\frac{3}{4}$ inches long, the distance from needle to base of arm being $10\frac{1}{4}$ inches; the latter has a bed-plate $15\frac{3}{8}$ inches long, the distance from needle to base of arm being $7\frac{7}{8}$ inches. The machines of this class show the judicious use of material to resist strain and secure stability. It has the capacity of 3,500 stitches per minute in light and medium weight fabrics, covering a wide range of work. These machines are not only distinguished for the great quantity and excellence of their work, but also for absolute cleanliness of operation, a feature especially desirable in stitching white goods. They can be used for tucking, hemming and other long seam work, as well as for sewing sheets, underwear in general, shoe linings, waists, shirts, collars and cuffs, overalls, vests, pants, etc. After the class had been going for five months, the need for special machines became apparent. A double needle and buttonhole machine were added. Fortunately, we were able to buy second-hand ma-

believed sufficiently in the idea to contribute \$970 towards equipment and running expenses. This sum, added to the appropriation from the school, supplied the sinews of war for the first year's experiment. A member of the committee very generously donated to the school a double-needle machine. Two manufacturers gave us two valuable machines. The classroom is now well equipped with machines for sixteen girls.

A Separate Work Room.

Men in the trade and members of the committee strongly recommended that such a class as this should be conducted wholly apart from, and outside of, any school building. The aim of the experiment is to conduct a class under actual shop conditions so far as this is possible. Our advisers felt that the influence and very atmosphere of a school would not lend themselves favorably to the project. Experience elsewhere seemed to show that where this kind of work is carried on in schools, sooner or later the

desired trade standards are lost. Teachers acquire too much of the air of pedagogs and pupils are allowed to take on the attitude of school children rather than that of workers.

It was out of the question because of lack of funds for us to obtain outside quarters, but we succeeded in getting far away from the other activities of the school by choosing a room with an exit to the street quite completely disconnected from the other parts of the school. This room had the disadvantage of being a small one, measuring but 12 x 22 feet, but the total separation from the rest of the building more than offset any inconvenience due to its size. So far we have noticed under these conditions that the shop standards have not suffered.

The Program.

Three mornings in the week, from nine to twelve, and two mornings from ten to twelve, the class has intensive academic work in subjects closely related to the shop-work of the course. This work has been under the guidance and supervision of Miss Grace T. Blanchard and Mr. Owen D. Evans of the Continuation School. It has been due to their close co-operation and interest in the work that the academic work has maintained such high levels. Physical exercise and instruction in hygiene and sanitation are also included in the morning's program. The routine of classwork is frequently varied by talks from outsiders. These talks help to bring into the schoolroom the practical point of view of the outside world and contribute directly to the aim of vocational education, which is to prepare the pupil for the realities of the working world.

The afternoons, from one o'clock until half-past five, are devoted to technical training. So far as possible the afternoon work is done under actual shop conditions.

Academic Courses.

In the academic courses, the method of group instruction is followed so far as it is practicable. But, owing to the fact that the pupils come from different grades, the instruction in arithmetic and English is more or less individual. The following is an outline of the academic work:

Time allotment per week:

- English, 4 hours.
- Arithmetic, 4 hours.
- Civics } 2 hours.
- Hygiene }

English:

1. Spelling: Words based on shop work, words based on study of textiles, and words required by the Boston School Committee for the regular grades.
2. Written English:
 - a. Composition: original, textiles studied and discussed in class, reproduction of stories.
 - b. Letter-writing: social, business,

application for a position, answering advertisements.

3. Oral English:

- a. Correction of common errors of speech.
- b. Story-telling.
- c. Reading.

Arithmetic:

1. Four processes (simple).
2. Fractions, decimals, percentage.
3. Problems (based on shop work, where practicable).

Civics:

Informal discussions of various city departments and their work. If time permits, this informal civics will be directed toward more formal civil government.

Hygiene:

Talks on personal hygiene and first aid to the injured. Informal instruction and guidance as the necessity and opportunity arise.

Mechanical Training.

To be effective, vocational courses must be modeled on actual manufacturing methods. The fact can not be reiterated too often that, if schools are to train for industry, they must know what industry is and learn something of its methods. The reforms in working conditions which are so much needed will never be brought about by schools that hold themselves aloof and refuse to recognize industrial conditions as they actually exist. Besides, there would be no point in maintaining a class with the professed object of training girls for a specific industry, if we did not train them to meet conditions as they will find them when they enter the industry. Indeed, this is the only fair thing to do by the pupils, since otherwise they might be so perplexed by the difference between shop and school work as to become discouraged and throw up their first real job. It is true that a second or third trial would probably reveal to the young girl the general uniformity of factory methods, but the school should help to prevent this costly method of learning by experience.

Method of Instruction.

One experience with regard to the method of instruction was interesting and illuminating. It merits especial attention. At first, the method most commonly found in factories was exactly followed. After a short period of individual instruction in the sewing of straight lines, each girl was set to work immediately upon marketable products. This method was continued for over two months, with the result that it was found to be a wasteful, expensive, and generally unsound method of instruction. By it the girls learned to use the machine and acquired some speed, but the finished product was found to be below

grade and of no commercial value. After six weeks of instruction, samples of aprons were submitted to the committee which decided that they were not up to the standard of marketable goods and that the school could not afford to jeopardize its reputation by offering poorly made articles. It was felt that in six weeks the girls should have learned to make a saleable article.

A radical change in the method of instruction was obviously necessary. A new plan of procedure was devised which very soon vindicated itself by its results. A progressive series of lessons was laid out and the girls were required to master each operation before being allowed to go on to the next.

Pupils are first taught, in groups of three or four, the use of the machine without thread. They are then put at individual machines for regular practice work. The girl uses a machine without attachments first, and works on the practice piece until she is thoroly acquainted with the machine without the assistance of any attachments. She is required to stitch straight lines and cross line, to hem on the cross, and to hem straight tucks. She is next taught to run the machine with attachments and then to alternate, running it part of the week with the attachments and part of the week without. When an acceptable practice piece is made, she is put to work on apron strings, and the girl who does the best work is soon put on circular hems and short-stitch seams. The series of practice lessons requires on the average two weeks' time, before the girls are ready to work on marketable products.

A careful record is kept each day of the amount and kind of work that is being done. Much attention is given to the grading of the girls. Each girl knows her rating, as she receives a slip from the teacher with her record mark on finished work.

Under the new method, it was soon apparent that the girls were able to produce more and better work in less time and were better able to meet emergencies as they arose. After four weeks of the new plan samples of aprons were taken to the buyers of two of Boston's largest department stores, both of whom pronounced the samples very good. One of the stores gave a standing order, and suggested that, if a better quality of materials was used, the store would also take the better quality aprons as the workmanship was already seen to be satisfactory.

Standards of Speed.

While it is the aim of such a class to discourage the practice of speeding up young people to a degree detrimental to their health, the problem of normal speed cannot be shirked by modern vocational education. Needless to say, the question of speed scarcely enters in at the beginning of the course. All the emphasis is placed on accuracy until the pupils have mastered at least the models set before them. But it is necessary that the girls shall attain, in the course of the term, an approximation of factory speed.

The teacher can encourage competition among the girls to work up their speed. It has been suggested that the last month of the girls' training should be devoted chiefly to acquiring speed. An arrangement has been made with two factories by which the girls have an opportunity to do part-time work before the end of their course. In one factory two girls work alternate weeks and, in another, alternate half-days. By this arrangement, the advanced pupils have an opportunity to discover what business demands as the rate of output. Either by this means or by an intensive training in speed during the last weeks of the course, they should be given this experience before going out to work.

The recommendation has been made that a study should be undertaken of standardizing the girls' speed as they increase in efficiency. This is a practical and much-needed step. There are doubtless many ways in which time could be saved without strain being added. For instance, a committee member observed that the girls wasted time and energy in handling their work, and suggested that the teacher should visit the factories to see what method is used by the trade. But, as we have already seen with regard to the method of instruction, the uncritical acceptance of factory practice does not always lead to the best results in trade training.

In discussing the subject of time-study, Mr. Robert G. Valentine says: "I do not feel that one can know too much about anything in the world, and time-study is an absolutely essential factor in the pursuit of complete knowledge, exactly as a clinical thermometer is an essential factor in making a medical diagnosis. . . . To my mind, time-study, like the introduction of machinery, is an unquestionably good thing for society at large, if so governed that it does not work injury to any one element of society. . . . The whole thing stands in my mind as a question of control. In any industry where there is a strong union and a strong manufacturers' association and soundly worked-out collective relationships, I believe that time-study as a part of job analysis, at least, can be safely introduced, not only without detriment to the worker, but as a factor in his positive benefit."*

In a co-operative class, such as the power-machine class of the North Bennet School, conditions are especially favorable for a disinterested experiment in time-study. Its practical application to the educational work with the class would clearly be of great value, since wholesome and reliable standards of speed can be arrived at in no other way.

Product and Materials.

The article to be made was an important question, requiring much thought and consideration. Aprons were finally chosen for the stock output. They were selected because it was found that there is

*The Human Element in Production, Robt. G. Valentine, American Journal of Sociology, January, 1917, pp. 482, 483, 484.

a fairly constant demand for trained apron-makers and also because the article itself requires simple processes, such as the stitching of straight lines, which properly come at the beginning of a power operating course.

The cost of materials determined our choice to some extent. The necessarily large amount of waste on which we had to figure together with the stipend we were planning to pay the girls (an amount for a half day based on the usual earnings of such girls in the unskilled trades they generally sought) made it necessary to choose an inexpensive material. Otherwise the cost of maintaining the class would have been so exorbitant as to militate against the success of the experiment and would have defeated our chief purpose, which was the demonstration of the practical educational and industrial value of such a class.

The Productive Shop.

The most important and significant feature of the power-machine class is the fact that it is based on the principle of the productive shop. Since the project involved from the outset the paying of a weekly stipend to the girls, there was every reason, both practical and theoretical, that the product of their work should be duly marketed. It was assumed in advance that the manufactured product of such a class as the one proposed could be sold for a sum sufficient to cover the cost of materials and half the sum paid to the girls. A reference to the financial statement printed at the end of this report will show that this assumption much more than vindicated itself in the course of the first year and a half.

The staple output of the class, aprons, is a commercial product very easily disposed of. As the class progressed, they made several kinds of aprons and had practice on waists, pajamas, flannelette shirts, layettes, and curtains. It seemed best, after a time, to stop making aprons in order to give the girls training on different materials which would enable them to go into different kinds of work. Orders were not solicited for articles except such as would, in the opinion of the committee, have an educational value for the pupils, as well as being a saleable product.

In connection with the making of aprons, the question arose as to whether it was not necessary to get better materials for the girls to work with. This was finally decided by having two grades, a cheaper quality for beginners and a better quality for the more proficient girls. This method which served as a new basis for promotion served also as a stimulus to greater effort and better work.

Orders were easily obtained for types of garments which were in the line of training. One order received for layettes amounted to \$1,000. In the matter of price, every precaution was taken by the committee that the school should not undersell, and thus run into difficulties with the trade. Disinterested buyers were consulted and the members of the power-machine committee who represented the business

point of view checked up the matter of price from time to time.

The early work of the girls necessarily resulted in the production of some seconds. These aprons, it was decided, might very properly be sold to the neighborhood at a reduced rate. On the other hand, as the girls became more proficient, the quality of their work was sometimes better in details than was actually required by the purchaser. It was the opinion of the committee that high standards of workmanship should be sought for regardless of whether it was directly and immediately profitable. For example, we continued to bind our aprons, though we did not receive any more from the buyers for the bound aprons, because it trained the girls to do neater work and gave them more experience.

Aside from its practical advantages, the productive shop has an educational value. One of the chief difficulties in industrial training is to maintain, within the school, the standards of workmanship required by the commercial shop. It is almost impossible, by pedagogical methods alone, to make these outside business standards into realities for the girl who is still under the influence of the school. But when the product is really marketed before her eyes, so to speak, she learns to know at first hand the kind of standards she will be required to meet as an actual worker in the industry.

The Teacher's Qualifications.

Beyond any question, one of the most important factors making for success in a class like this, as indeed in any kind of class, is the choice of the teacher. Probably trade experience is the most important single qualification to be considered in selecting the teacher. But trade experience alone is not enough; it is not enough even if she has perfect control of machine and materials and is a perfect craftswoman. The teacher of power-machine operating, as of arithmetic or science or woodworking or cooking, must know how to teach. She must possess sympathy and understanding and ability to lead; she must have a genuine interest in the needs and desires of her pupils and must know something of the social and economic conditions under which they live. If these qualities cannot be found in the trade trained person, they should be sought for in the trade school trained teacher; for they are indispensable.

The power-operating class began with a teacher in charge who had had seventeen years' experience in the trade and who had been assigned for some of this time to instruction work. Even so, her work with the girls was not successful, because she lacked the personal qualifications necessary for dealing with girls of this age. When the method of instruction was changed, for reasons which have already been dealt with, a new teacher was also put in charge.

The present teacher had her early training in a large shop in Edinburgh and was for eight years a forewoman. She began by testing each girl in order

to know her individual needs. She demanded good conduct and earnest effort. She gave special emphasis to the care of the machine, cleaning, threading, and winding of bobbins, and also to the position of the worker, and the method of handling the work. Under this regime, the girls' interest increased and they began to be ambitious to be rated as excellent workers. Their work improved both in quantity and quality. On one occasion when the teacher was obliged to be absent for five days the girls worked splendidly by themselves with one of their own number as forewoman.

Girls who went into the factories from this class were reported by the employers that they did unusually well in their ability to follow directions.

The Power-Machine Committee.

The successful development of the work with the power-machine class owed a great deal to the interest and effort of the committee in control. It is one of the principles of modern vocational education that educators need the advice of business and labor men to solve its problems. Without the co-operation of these practical advisers, the schoolman cannot hope to develop a system of vocational education that is sufficiently in touch with the realities of the wage-earning world. The power-machine committee was fortunate in having as members several public-spirited manufacturers, one of whom was a woman. The careful and ungrudging attention given by the committee to the detailed work of the class helped to keep the standards of workmanship and efficiency above the level of ordinary school requirements. Thru the committee, also, points of contact with the business world were established, thus strengthening the link between the school and industry and promoting the primary aim of the experiment.

Men's Evening Class.

The full utilization of the work-room and equipment was brought about by the opening of a man's power-machine operating class in the evenings. The purpose of the class was to train men to enter the skilled tailoring trades. They were taught to operate power-machines and to construct various parts of garments. Twenty-one men registered for the class, most of whom were pressers who desired advancement within the garment factory. Other men came from unskilled jobs in laundries, candy factories, and spaghetti factories. One man was a shoemaker, a skilled workman in a declining trade, who took the opportunity offered by the evening class to retain and transfer his skill to the growing trade of garment-making.

Few of the men could speak English. The committee in charge of the power-machine class urged that they should attend the evening public school to learn English. The teacher of power operating was the secretary of the local garment workers' union. Those who gave their approval of the work were

educators, representatives from the manufacturers' association, and the trade union. Thus the men's evening class was fortunate in securing the co-operation of all the interests essentially concerned in such an experiment.

Some Results of the Experiment.

Thru the organized vocational guidance and placement bureau of the school definite results of the power-machine operating experiment have been ascertained. This bureau was organized in June, 1915, with two secretaries who give their full time to the work. Its work is allied with the Boston public schools thru the Boston Placement Bureau under the direction of Miss Susan Ginn. Too much cannot be said of the value of such a bureau in connection with any educational experiment. It is the instrument which measures amounts and quality of the results. It furthermore acts as a sales agent for our educational wares. As a matter of conservation, it is highly important that such a department of vocational guidance and placement be connected intimately with this experiment.

Tho the power-machine class has been in operation but little over a year, good results are already visible in the records of the girls. The following histories show the value of the course for individual pupils. These girls were placed and followed up by our Placement Secretary, Miss Ethel Fletcher.

Katharine graduated at fourteen from our pre-vocational school. This was in June, and in July she got her first job stoning cherries. Even the \$5.50 a week did not stifle her longings to learn something. Dissatisfaction drove her to a dark, ill-smelling factory, where she made gate-tops for bags. One week's experience, netting \$3.50, made her little richer and much wiser. Next she tried a candy factory for two months. Steadily packing dozens of boxes each day grew very monotonous. She left this job, where she earned \$3 a week, to enter our power-machine operating class at \$2 a week. After six months' training, she entered a curtain factory. She works on a hemstitching machine and earns an average wage of \$9 a week. She says, "The power-machine operating class did lots of good for me. I earn better pay, have cleaner work, am happier. I would advise my friends to join it. I would never have got along so well without a trade."

Frances Krulesky left Poland eight years ago. Family circumstances forced her to leave the eighth grade to go to work. Three months' employment in a rubber shoe factory taught her the harshness of unskilled work. Leaving her \$6 a week job, she entered our power-machine class at \$2. Her mother's work allowed her to make such a change. A week ago she was placed in a factory where she will soon earn \$6 a week. Frances wanted a trade and likes her work, because "It's easier, cleaner, better paying, and the girls are nicer. Sure, I'm glad I took P. M. O. at the school."

Margaret Rocco graduated from the Hancock school in June, 1916, and then entered the power-machine class. Two weeks ago she was placed in a factory making aprons and underwear. Working at piece rates, she earned \$6.05 the first week and last week she earned \$6.50. Margaret has no doubt her training helped her. She recommends it for her friends.

Mary Vitalo left grammar school in March, 1915, and became a milliner's apprentice. Here she worked without pay for six months. Next she worked for a milliner for six weeks at a weekly wage of \$4. Losing her place at the beginning of the dull season, she became a bundle girl for a two weeks' sale in a large department store. Now she took a course at a dressmaking school, which found her no job but cost her \$50. Losing courage, she left this school. Hearing of our class, she entered in June, 1916. She has since made good progress in an apron factory, where she earned \$5 a week at first. Within a month, she had a "raise" of 50 cents a week. Mary says, "The P. M. O. class is good. You did what you promised; you got me a job I like."

Conclusion.

In reviewing the work of the year, the committee feels that the experiment thus far has been in every way successful. As an educational demonstration, it promises to be permanent and useful. It has been genuinely effective in deflecting girls from "blind alley" jobs into a skilled occupation. In this connection it is well to remember that "blind alley" employment is harmful not only because it fails to provide permanence in a particular job or to equip the young worker for a definite occupation but because it leads to what may be designated as "blind alley" character. The training given in the power-machine class not only fits the girl for her job but makes her a more intelligent worker, improves her physical conditions and opens the way to the larger personal life which correlates with a larger vocational experience.

It has further been demonstrated that a finished product can be made which has a marketable value, tho we must recognize that for each group there is a period of training which is financially unproductive. At the same time, the girls are retained under school

influences from six months to one year longer than would otherwise have been the case. The postponement of their entrance into industry is beneficial from every point of view, from that of their own immaturity and from that of the already over-stocked market of unskilled labor.

The work of the pupils who have been placed in the power-machine operating trades must be carefully followed in order that it may be determined whether the period of training results in more rapid advancement. The experiment is still so recent that most of this follow-up work remains to be done. However, the girls have already made a fair start in an industry which offers the maximum of opportunity for women whose wage-earning must begin at sixteen. The training they have received will help to place them securely outside the ranks of the unemployed, for it is an industrial axiom that the more skilled the girl worker is the less in danger she is of being turned out of employment in times of depression.

The results of the experiment well warrant a re-trial in other schools and other cities. By the proper co-ordination of all the factors essential to success, so that, for instance, the commercial purpose does not outweigh the educational or vice versa nor the productive work of the class result in throwing other wage earners out of employment, the commercially self-supporting shop can be carried on as sound educational project. It deserves to be tried in many other communities.

Financial Statement, Power-Machine Class.

November 1, 1915, to February 1, 1917.

Equipment.....	\$ 333.35	
Supplies.....	1,329.16	
Accessories.....	209.58	
Salary of teacher.....	744.00	
Girls' wages.....	1,586.01	
Cutting.....	59.41	
Incidentals.....	55.54	
		<hr/>
		\$4,317.05
Donations.....	\$1,729.00	
Tuition.....	65.39	
Sales.....	2,912.58	
		<hr/>
Total.....	\$4,706.97	
Total Expense.....	4,317.05	
		<hr/>
Balance.....	\$ 389.92	
Expenses for 15 months.....	\$4,317.05	
Income exclusive of gifts.....	2,977.97	
		<hr/>
Net cost for 15 months.....	\$1,339.08	

THE IDEAL

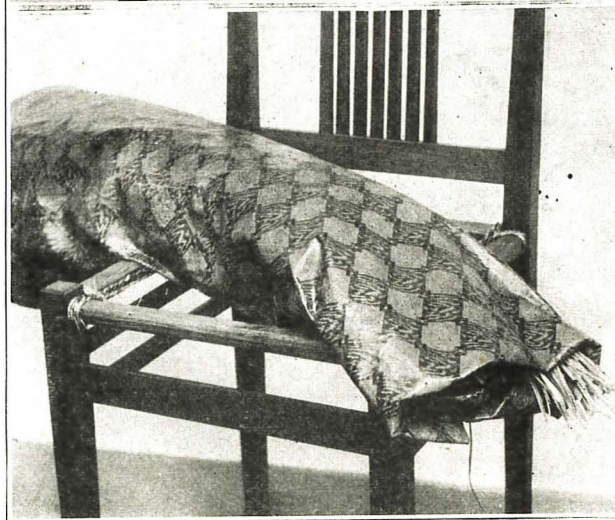
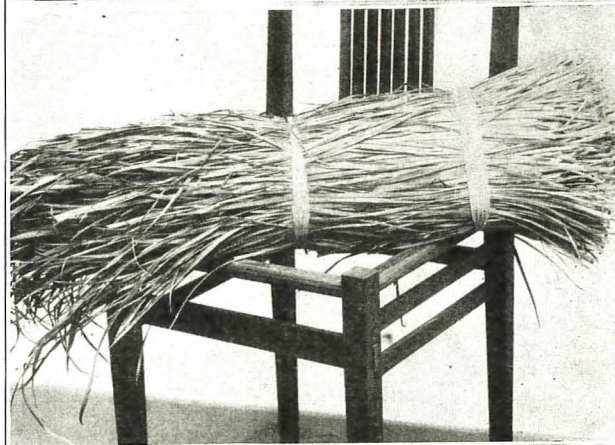
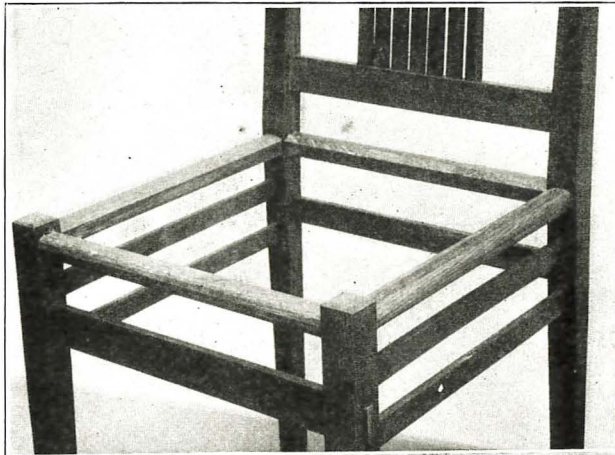
Men dispatch the day's weary chores and fly to voluptuous reveries. They eat and drink that they may afterward execute the ideal. Thus is art vilified. Would it not be better to begin higher up,—to serve the ideal before they eat and drink; to serve the ideal in eating and drinking, in drawing the breath and in the functions of life? Beauty must come back to the useful arts, and the distinction between fine and the useful arts be forgotten. If history were truly told, if life were nobly spent, it would be no longer easy or possible to distinguish the one from the other. All nature is useful, all is beautiful. It is therefore beautiful because it is alive, moving, reproductive; it is therefore useful because it is symmetrical and fair.—*R. W. Emerson.*

A FLAG SEATED CHAIR

Prof. S. C. Roberts, Pullman, Wash.

THE lines upon which the modern factory-built chair is constructed are difficult to realize in school shop practice, as all experienced manual arts teachers well know. The chair here presented is an attempt to approximate the conventional lines and dimensions and yet employ only straight lines, and at all points of juncture, right angles. The front appears slightly widened by giving the front lower rail a protruding tenon. The back appears slightly widened upward by tapering the posts on the inner side and by slightly tapering the small vertical splats.

The design will be found suitable for construction from any of the better varieties of cabinet lumber and by average classes in elementary cabinet-making. As for strength, the chair photographed for these cuts was subjected to a test of five hundred pounds placed upon front edge of seat and balanced upon the back posts. The wood is walnut. The frame upon which the seat is woven is tough oak.



Figs. 2, 3, and 4.



Fig. 1.

The flag seat, very common in the days of our fathers, is again in demand by many who appreciate in their furniture the assurance of long service, as well as of skilful, artistic and indisputable handwork. It is to be observed in passing that rush seating is quite often classed and sold as flag tho much inferior to it in point of appearance and durability. Cattail very closely resembles flag, and is the only material deserving to be classed with it.

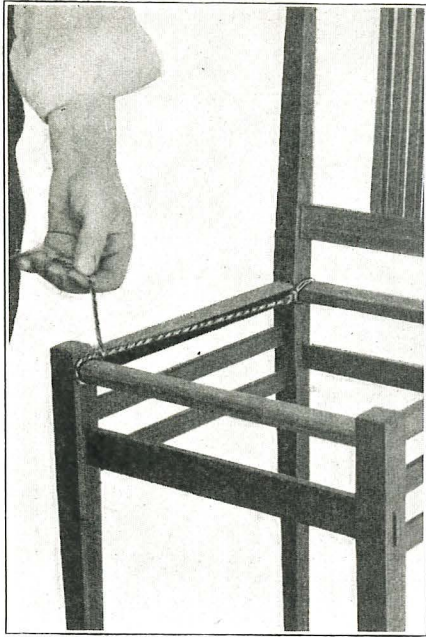


Fig. 6.

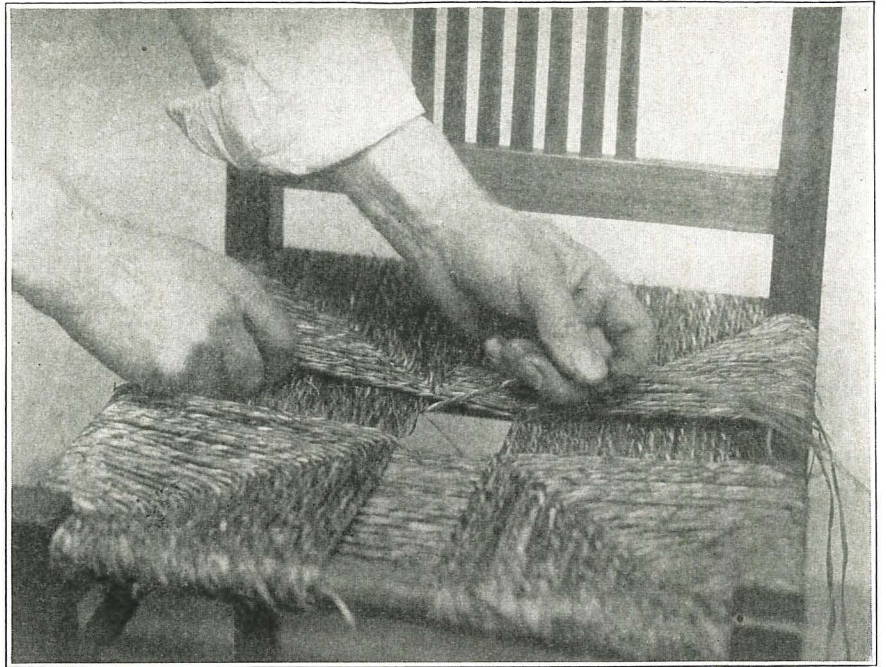


Fig. 9.

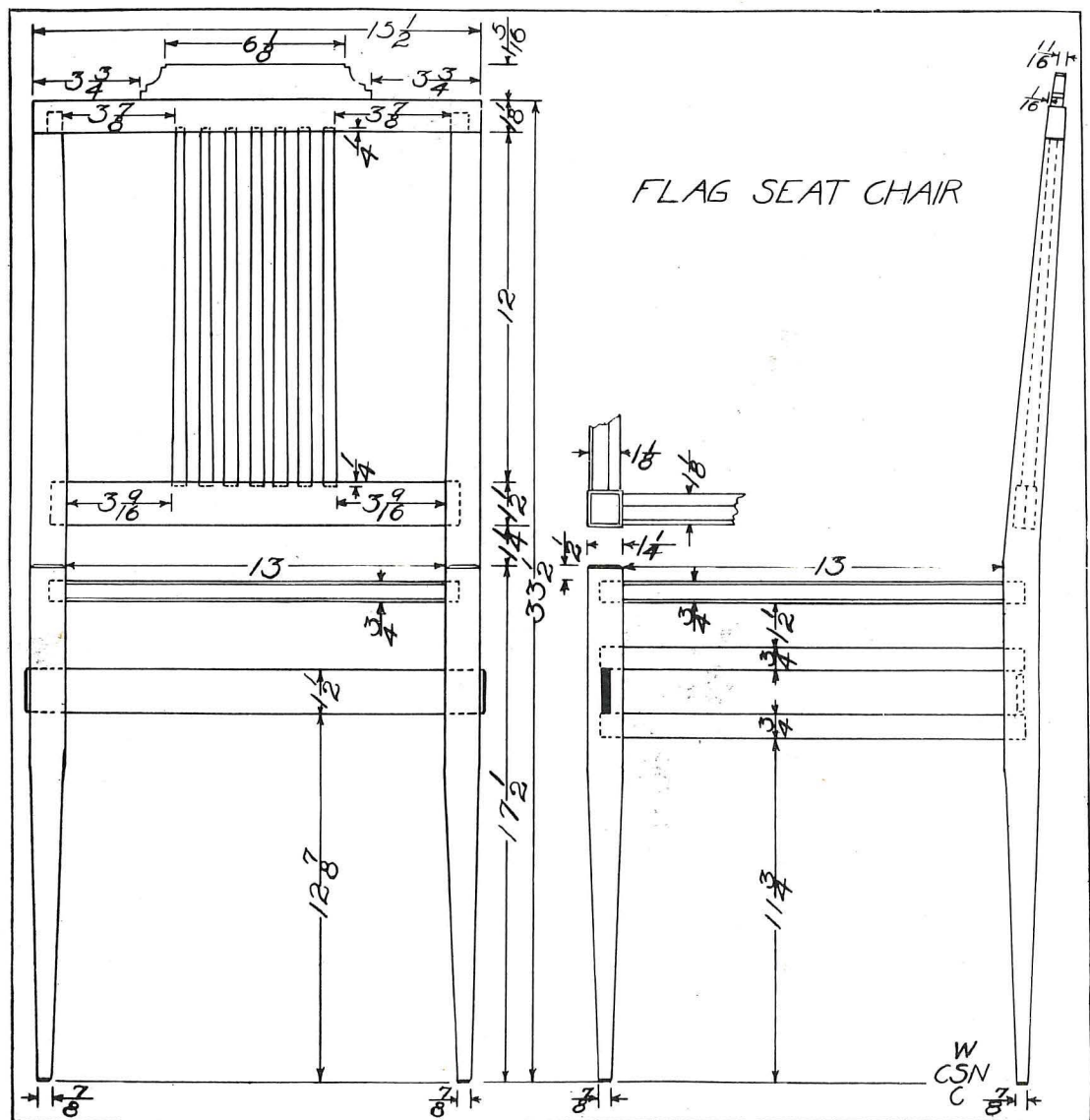


Fig. 5. Details of Chair.

Flag is a name given to the leaves of iris, a lily found growing wild in most marshy lands of the temperate zone. It is easily recognized by its early spring flowers, sometimes called American *fleur-de-lis*, as well as by its large inverted pear-shaped seed pods in the late summer. The leaves grow from six to 36 inches high and from one-fourth to three-fourths of an inch wide. The flag shown in these cuts is from the variety classified as *Iris Missouriensis*, and is quite common in all the moist lands between the Rocky and the Cascade Mountains. Here it grows in large bunches to a height of twelve to thirty inches, the leaves being about three-eighths of an inch wide.

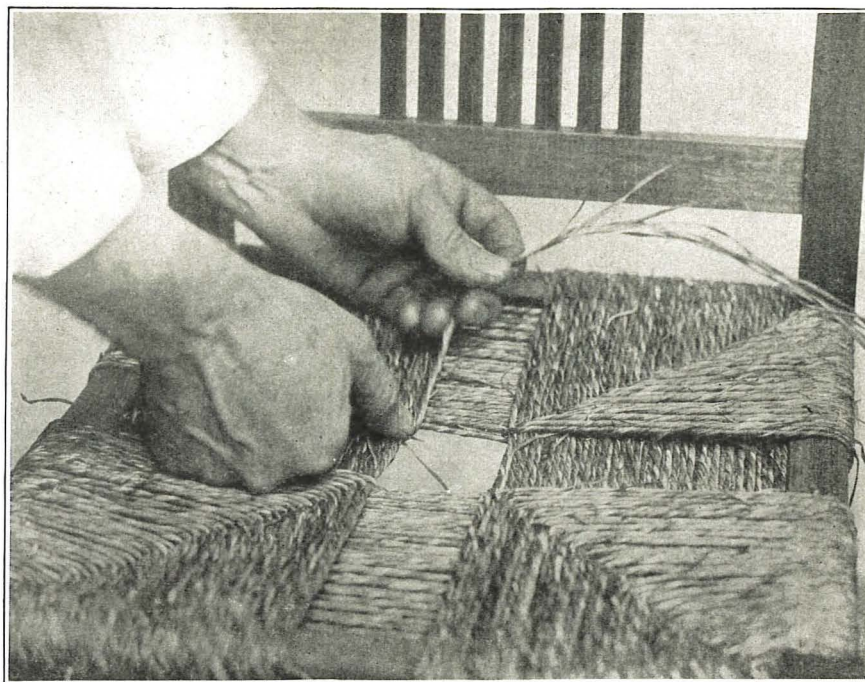


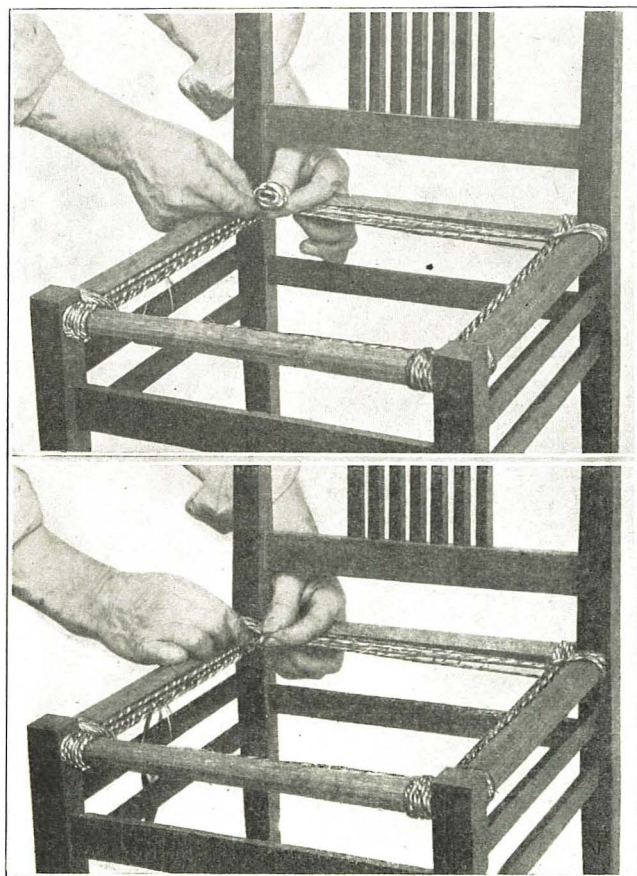
Fig. 10.

Flag for weaving should be cut at any time after the seed is well developed, preferably just before the leaves begin to break down. At this time the body of the leaf is a rich green, the tips brown, and the lower three inches snow-white. The leaves should be cut with a sharp mattock or adze, below the surface of the ground and as near the bulbs as pos-

sible. After cutting, they may be picked up by their white ends and tied in convenient bundles for handling. They should now be spread out thinly in a dry, shady room for curing, when they should again be tied up in larger bundles until needed for use. In this condition it requires from two and a half to three and a half pounds to seat a chair. Figure 3 shows such a bundle. In this condition the leaves are very brittle owing to the very open cell structure which must be broken down to develop the strength of the fiber. To do this, dip the bundle into a tub of water, lift it out carefully and wrap it in oilcloth, where it should remain from six to twelve hours. It is now ready to use.

Draw out a small handful at a time as shown in Fig. 4, keeping the rest moist until needed. Take from four to ten leaves according to the size of twisted strand desired, (in this case one-eighth of an inch diameter) and tie the white ends to the chair frame as in Fig. 6. Draw the leaves between thumb and finger to break down the cells and give them a complete turn about every half-inch or a little less, adding a new leaf as needed to maintain a uniform strand, by inserting the white end between those already in use.

The manner of weaving is shown in Figs. 6 to 11. The fingers will tire quickly for a while and so Figs. 7 and 8 show how to roll and tuck the ends while resting. If the work is to be left more than a few minutes a moist cloth should be wrapped round the "tuck" until the work is resumed. Fig. 9 shows taking up slack preparatory to making a turn, and Fig. 10 shows how the turn is made. These are the all-important points in the weaving as they determine the regularity and smoothness of the work. Fig. 11 shows another "tuck for rest."



Figs. 7 and 8.

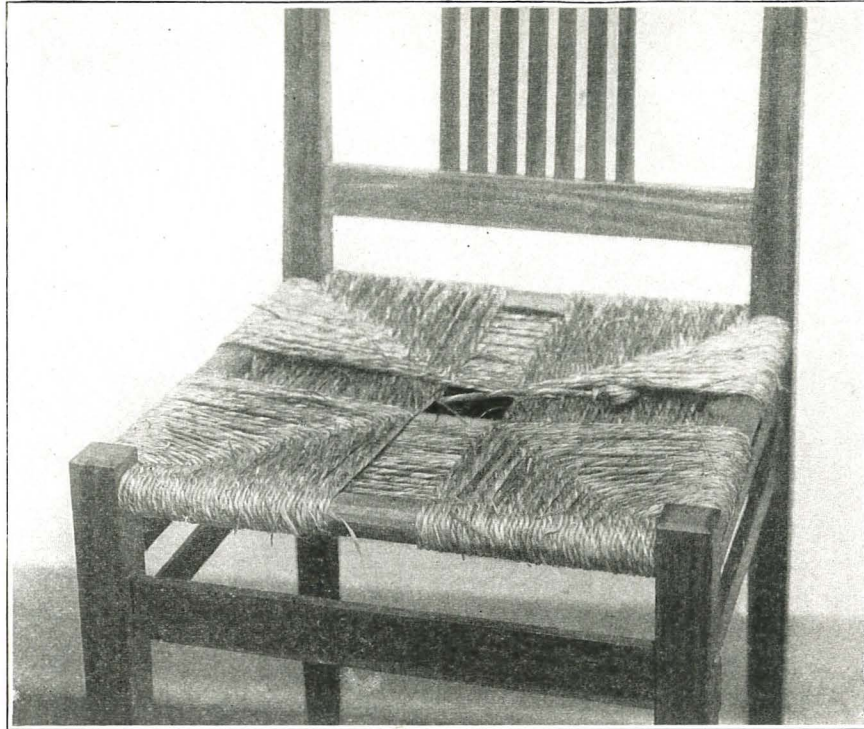


Fig. 11.

It is desirable to complete the weaving before any portion of the work becomes dry as it shrinks considerably in drying and may cause the "turns" to stack up. The chair shown was woven with but one rest in a period of six hours.

If the weaving is well done, the seat will close perfectly in the center, when the end may be fastened by means of a small wire staple. The end may also be secured by tying with a bit of hemp cord to an adjacent strand. The seat should now be thoroly dried but no weight should be put upon it until it is filled. Brush off the tips that show with a moderately stiff bristle brush such as is used for cleaning vegetables. The filling may be done with linseed oil and turpentine with shellac or with elastic varnish. The author has secured the best results with three coats of white shellac. Several chairs so treated have endured hard

service for more than ten years without any evidence of wear whatever. Oil and turpentine, proportioned ten to one, gives good service but takes more time to dry and darkens the colors. Varnish is likely to crack and peel off. White shellac beautifully accentuates the mingling of green, brown and white, and retards fading for a long time.

When the filling is dry, turn the chair bottom up and fill the spaces between the middle and lower layers of woven strands with fine-cut but tough excelsior. The excelsior may be stuffed in evenly by means of a thin piece of hardwood three-quarters of an inch wide and six or eight inches long. It should be as thin as consistent with necessary strength.

Completed as shown in Fig. 1, such a chair should give reasonable service for at least fifty years.



Design for prize to be awarded in high schools by School Art League, thru gift of the art in Trades Club. Medal winning second prize is shown at right.

Industrial Design will be recognized in each of New York's high schools thru the award of a bronze medal for the student whose work has been best thruout the school year. The Art in Trades Club has secured a design for the medals thru the Beaux Arts Institute.

To arouse interest in the medal, the club obtained co-operation of the Beaux Arts Institute. Thirty designs were secured from young sculptors in preliminary contests, and six of

the designs were selected for the final competition which was held late in June. At this time prizes were awarded as follows: Giuseppe Cecere, 1st prize; Frederick B. Clarke, 2nd prize; and L. Bayman, 3rd prize.

The design by Mr. Cecere has been reproduced in bronze by the Gorham Company and two medals will be supplied for each of the 24 high schools; one will be awarded in February and one in June.

Training of Girls and Women for Trade and Industry

Mary Schenck Woolman, Specialist in Vocational Education, Boston



WOMEN and girls are entering wage-earning pursuits in constantly increasing numbers, at present approximating ten million. Those who have been watching this growing army during the last two decades, during which time the numbers have doubled, and who are considering the causes of it, have little doubt of the permanency of women in industry. Important occupations require the skilful and the deft handling of women, for men have been unable to succeed as well in them. The women's clothing trades are rapidly increasing all over the 'country. Prior to 1890 there was little of the dress and waist manufacturing; since 1900 it has grown so rapidly that it has become one of New York's leading industries. Today there are more than three thousand establishments with a hundred thousand wage earners and an annual output of about three hundred million dollars. Eighty-four per cent of the workers are women.

While New York is the center, other cities, such as Boston, Minneapolis, and Chicago, are rapidly following. In 1914, Boston had eight thousand workers and twelve million of capital invested. As New York only supplies large-quantity orders, retail stores in other cities are finding it necessary to urge small shops in their localities to provide them with small lots of special garments.

It was in this industry in New York that a significant step was taken for women in industry. A Protocol of Peace was made, after long discussion, between employers and employees, by which differences would be submitted to arbitration. There are, naturally, difficulties to overcome, for human nature adjusts itself slowly to new points of view, and workers, over-burdened with their hardships, forget that capital also has its trials. The action is promising, however, for the improvement of conditions of women in industry.

The youth of workers in the dress and waist industry indicates that training must be given early if it is to be of service, for one-half are below 20 years of age; one-quarter between 20 and 25, and only one-quarter above 25. A large number marry and leave wage earning for a time, at least. As the majority of young wage earning men are untrained they are often unable to support families adequately and their children must work as soon as the compulsory school years are over. The wife, also, often returns to her trade after a few years.

The latest report of the industrial commission asserts the economic need, in the big industrial cities, for the majority of the daughters and even wives of

wage earners to work. If girls of fourteen or fifteen are left untrained the unskilled industries alone are open to them. To make compulsory laws keeping girls in school when the family income is below the possibility of adequate support to the family is a hardship unless courses of work can be given them which will directly help them to earn the money needed for maintaining a decent standard of living. This can be given in part-time courses while they are employed or in all-day courses before that time if they can afford the time. To give them home-making courses alone, as is constantly suggested, when years must pass before they are directly interested in marriage and home-making, is not only wasting valuable time, but is also taking from them the chance of being trained to immediately enter the better class of occupations and is risking their moral and physical development. The time for home-making courses is not at fourteen years of age for the girl who must work for her own and her family's support. Such courses can, and should, come later when she is older as a part of continuation work or in evening classes. Every elementary and the high school should have household arts courses as a part of general education.

The influence of the dull, unskilled task on the untrained girl worker is frequently pernicious. The blight of over-fatigue is especially unfortunate. The natural impulse of youth to go to the extreme of excitement causes the young worker nightly to frequent cheap shows and dance halls and seek gay companions. To safeguard the country we must protect these girls and see to it that their lives as wage-earners are lived in as wholesome a way as possible. Training of an adequate kind will not only enable them to rise to better positions with higher wage, but may be a distinct help to them as home-making women and citizens. It is deadening to the spirit of youth to feel that there is no chance to get ahead. At the present time, with the war upon us, women are entering occupations new to them and having often heavier tasks than they have heretofore been called upon to do. They are succeeding beyond what was expected of them. It is even more necessary than ever before to train them to do intelligently the work immediately before them.

The follow-up systems in such schools as the Manhattan Trade School in New York, the Boston and Worcester Trade Schools show that the education of fourteen-year-old girls to wage earning positions in worth while trades has been successful, enabling them to enter the trades best suited to each and at a fair wage, giving them instruction which will eventually help them to rise to better positions and salaries and in developing in them qualities needed in trade and of equal importance in the homes. They have

become more earnest, helpful home-makers as daughters and finally as wives, on account of the trade training and the use of academic teaching to develop industrial and civil interests. Many of these girls have risen to very responsible positions in trade or have entered the field of teaching vocations.

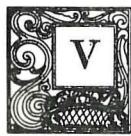
The influence of the trained workers on the trades themselves has been commented upon by employers and by the trade unionists. In the garment trades the tendency has been away from over specialization in that the trained workers are depended upon to make an entire waist or garment. New branches of trade have been more readily introduced, for the worker has not been afraid to try, as

her training enables her to more readily swing from one occupation to another than is possible for the untrained worker.

So clearly has the many sided advantages of vocational education been shown in the schools already opened that it would seem that girls who are not forced to work would be benefitted by such early training. They would then know by experience what it means to earn a dollar. They could be of greater civic service before their marriage. If reverses came they would be prepared for them, and in middle life when their families are grown they could enter the wage earning or social betterment fields as skilled workers and be a resource to the state.

APPLIED ART IN WINDOW DECORATING

Miss E. D. Hansen, Virginia, Minn.



VIRGINIA is a thriving, prosperous little city of 18,000, situated on the Messabi Iron Range in the northern part of Minnesota. Two department stores in this city have paid window decorators.

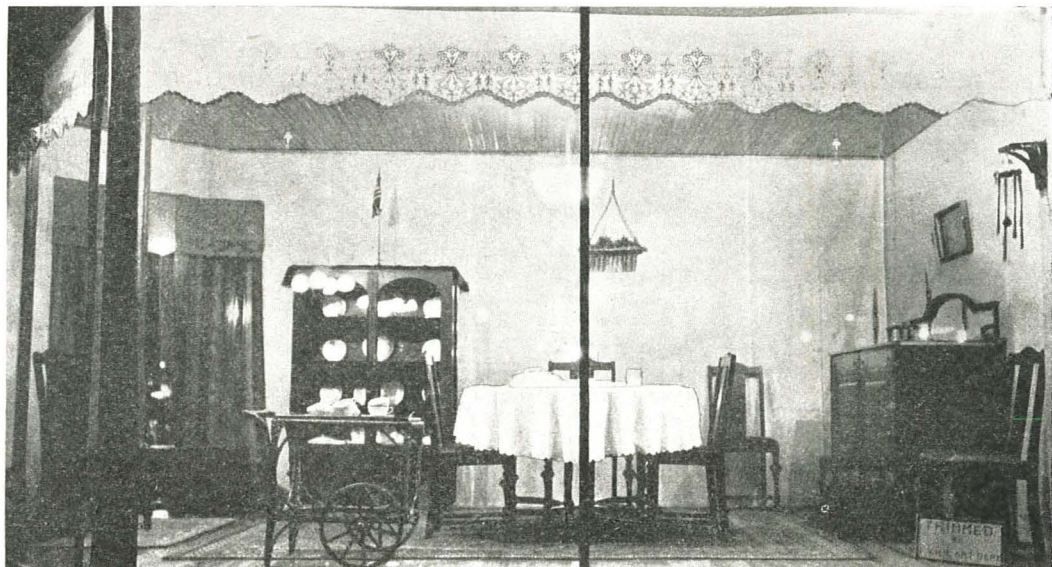
Many stores change their window displays occasionally to show the different seasons' merchandise, while other stores have seemingly adopted the slogan: "The more crowded the window, the more kinds and colors of articles exhibited, the better." Color harmony and arrangement have been "unknown quantities."

The high school art class had observed the inconsistency of such a slogan. Thruout the last school year this class has been spending considerable time on problems involving color and design. They applied these in various problems of book covers, costume design, interior decoration, etc. The class conceived the idea of making their work even more practical, and decided to attempt the task of correcting the current idea of store window displays.

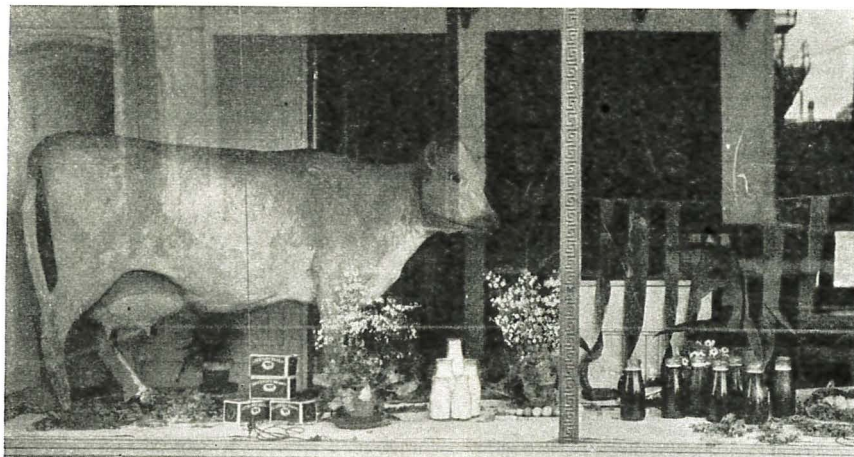
For some time they studied the principles of window decorating and theoretically planned many such displays. Colored chalks and blackboard were used as mediums. They tentatively sought an opportunity to apply what they had studied and planned.

A careful survey of the city having been made, a notice was then placed in the local papers offering the services of the class as window decorators to any merchant who wishes to volunteer the use of his windows. Requests for decorators came from almost every line of goods in town—in fact they ranged from drygoods to dry cleaning establishments. The number of windows offered was so numerous, that it became necessary that the pupils draw lots to ascertain the window each should decorate. This having been done, the merchant was then consulted as to what particular line of goods he wished to advertise at that particular season.

Each student, now having his assigned window, went to work to design an arrangement and a color scheme to be used. Merchants agreed to furnish



A Prize Window Decorated by a Student of the Virginia, Minn. High School.



A Grocer's Window Decorated by a Student of the Virginia High School.

paper or bunting or whatever else necessary in decorating his window. A complete plan of the window was made before any attempt at decorating was made.

The work was done during the regular art period. Competition among the students ran high to see who could produce the best window. Arrangement, color and "selling value" of window must be kept in mind. After the window was decorated, a small placard was placed inside which read, "Trimmed by V. H. S. Art Department."

The results were indeed creditable and elicited much favorable comment from every class of citizens who were interested to see what students could do. Merchants, who heretofore had completely neglected their windows, got busy and either asked help from the class or renovated their own.

A druggist, who noticed the effect of the window

decorating crusade, offered two cameras for the two best window displays. This added interest to the work.

The second attempt was even more successful. A prize was offered for the best grocery window, another for the best candy kitchen window and another for the best drug store window. These prizes were all donated by merchants.

The experiment worked out so well in Virginia that it might well be worth while to try out in other small cities. It is sure to bring the high school art department (which is usually looked upon by the average businessman as being impractical), the merchants and the townspeople in co-operation. It makes people see that after all there is something really practical in public school art, and not that it is as it is generally said to be, merely "picture making."

JIGS IN BENCH METAL WORK

Roger W. Hastings, Instructor of Metal Working, Chestnut Street School, Springfield, Mass.



JUST as we find that the use of jigs and fixtures in the woodworking department helps to acquaint the boy with manufacturing methods and to raise his standard of judgment as to just what accurate work in the making of duplicate parts really is, so we have found that the use of a similar class of fixtures in connection with bench metal work has greatly increased the boy's interest in that department of our work thru bringing its work more in accord with that of real life. Because of an increased output and greater accuracy of the finished product, the boy feels that he is approaching the accomplishment of a workman in a real manufacturing plant.

Our first attempt in this direction took the form of a drill jig and bending fixture used in connection with the manufacture of a small drawer-pull for use in our own department and in the various manual training shops of the city. The drill jig, Fig. I, was built on a wooden base and consisted of two

metal strips placed just far enough apart to allow the stock to rest between them. A bridge was then bent, using the same material, allowing a distance between shoulders just equal to the length of the stock for the drawer-pull and a hole drilled near each end thru which the drill passed, giving it the proper location on the piece being drilled.

Perhaps a value to the boys fully equal to that of properly located holes was the check the jig offered on the length of the stock. These parts were cut slightly long by the use of a hack saw and sawing jig, and then were filed to length. A piece too long would not enter the jig, while the drilling foreman, of his own accord, refused to drill those filed too short, as he found the holes came poorly spaced and made a poor showing for his department.

The bending fixture, Fig. I, is made of maple with 1-16" cold rolled steel facing. The die is secured to a base board and receives the punch which is directed by guides screwed to the same base. The work is placed between the die and the punch and

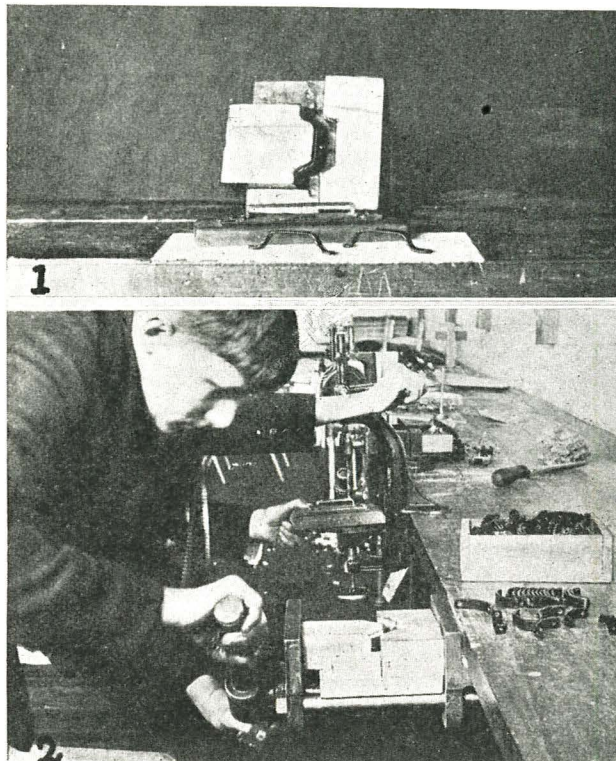


Fig. 1. (above) Bending Fixture. Fig. 2. The Fixture in Use.

located between proper stops to hold it central. So far we have been able to supply ample pressure for any of our work by using our woodworking vises as presses. Fig. II shows both of the operations of drilling and bending as described above, altho this particular picture happens to show work on sled braces made last winter.

With the approach of spring we turned our attention to the manufacture of one hundred go-cycles. Here again an excellent opportunity was offered for the use of the drilling and bending fixtures. In this case the variety of the parts, in length and location of holes, suggested some form of adjustable drilling jig resulting in the form illustrated in Fig. III. The construction used this time consisted of a number of short bridges placed at right angles to the work and having only one hole in each. This allowed the moving of any hole in relation to the rest, giving all the flexibility necessary. Stops were provided to accommodate the different lengths of stock. This

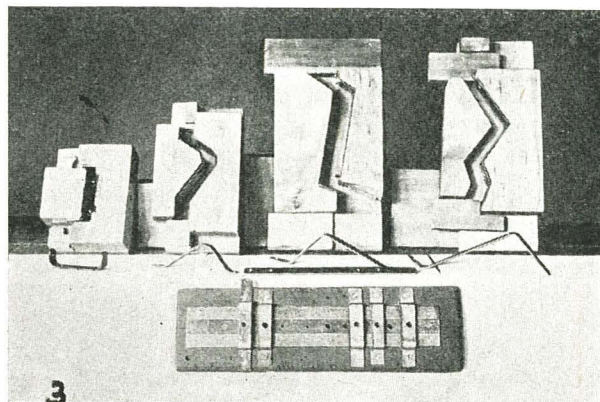


Fig. 3. Bending Fixtures and Adjustable Drilling Jig.

adaptability of the jig to all the parts on the job greatly increased the boys' respect for the usefulness of such a fixture on more complicated work. The value of the bending fixtures, Fig. III, for this job became very apparent when the assembling department took hold of their work. The parts had all been made, drilled and bent before the assembling was started. The ease and rapidity with which they were able to carry on this work proved the interchangeability of the parts. These bending fixtures were a little more complicated in shape than the drawer-pull fixtures but it was not found necessary to change the construction.

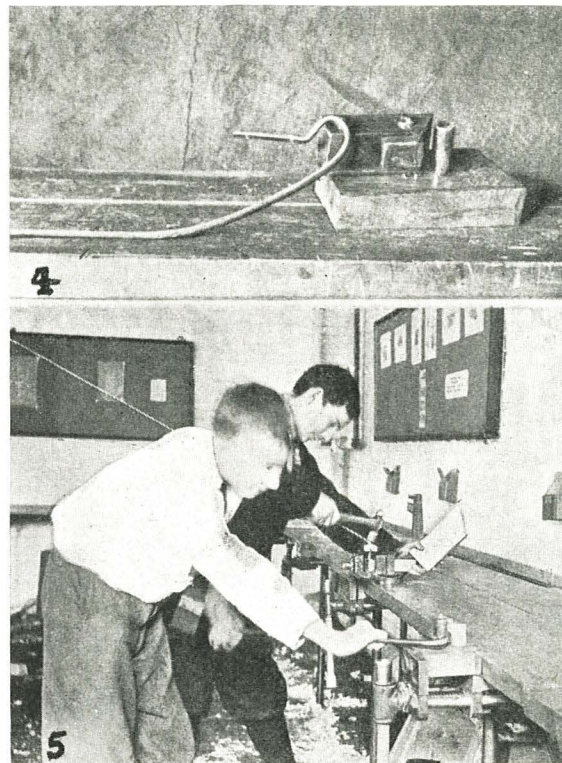


Fig. 4. Bending Fixture and a Sled Runner Bent with it.
Fig. 5. The Bending Fixture in Use.

Still another form of bending fixture was that used in forming the front end of our sled runners. We wished very much to avoid the sharp bend at the point of the runners. With the equipment at hand it seemed best to bend the stock cold. In order to do this the shape shown in Fig. IV was used and easily bent in the fixture shown.

The stock, one-half inch half round iron, was first bent in a vise with a hammer, Fig. V, to fit a gauge and then transferred to the bending fixture and with a strong pull wrapped part way around the post. In the construction of this fixture the item of strength was of considerable importance. The blocks were made of maple and faced with cold rolled steel. A piece of three-quarter inch iron pipe was used for the post. With this equipment the boys were able to produce runners of uniform shape which met all the requirements and which added a distinctive appearance to the finished sleds.

Teaching Lettering in the Common Schools

Rodney S. Brace, Homestead, Pa.



No doubt we will find that schools with purely industrial or trade courses have teachers of mechanical drawing who understand shop and drafting-room conditions. The pupils of these men should produce a lettering which is readily acceptable in any establishment where the boys may seek employment. No one who is familiar with the lettering which is taught by the free hand drawing, the shop drawing or the manual training teacher can hold any such supposition about the work which their pupils are able to produce. All these teachers are teaching lettering and, most of them, are teaching a good kind of lettering, but just imagine the condition of the mind of the child who has been taught to do only vertical capitals in free hand drawing, only oblique capitals in shop and whose mechanical drawing teacher insists on upper and lower case letters in script and seems not to care whether the letters are vertical or oblique. Such a condition is not overdrawn. Each of us can find something near it unless he lives in a district where there is unusual co-operation. The main reason for writing this article is not to criticize what is being done now but to urge a get-together movement that will prove helpful to all, especially to the pupils. The methods suggested are not necessarily the best and any group of teachers should be able to arrange and agree upon a scheme that is just as good. The idea of grouping the letters is held strongly by no less authority than Dr. James P. Haney of the New York schools.

Thruout the drafting rooms of any district it will be possible to find one of two systems followed in the requirements as to lettering, made by any one superintendent. In some cases the shop has standards and conventions of its own which must be followed by every man who works there. They use a certain form of letter, a certain position for the dimension and certain connection lines and all these must be uniform if drawings are to be acceptable in that shop. One of the largest electrical companies in America has two shops under different management with only an alley separating them. One shop makes electrical appliances and the other electrical machines. Should an expert from one drafting room be transferred to the drafting room of the other shop it would be necessary for him to change his habitual method of drawing the conventions which have been mentioned.

The other system which will be found is that of accepting any clear and definite method of lettering. The superintendents who follow this plan usually prefer the older schemes of dimensioning. A young man who comes into this office as tracer is expected to supply good lettering where the designer has only written or indicated it. Large and efficient corpora-

tions accept for this work the boys who can make good, clear letters of almost any form.

The important thing to do when planning a system of lettering to be taught in any school is to pick out an alphabet which is simple and clear enough to be understood by the pupil. If local industries are agreed about it, use their kind. The same alphabet can be used with the younger pupils who print with a soft pencil as is taught to the high school boys who are making small letters with the hard pencils. A uniform system varied only for decorative purposes is the important part of any plan.

Most teachers are agreed that a good, clear capital letter is better than capitals and small letters when there is not much time for practice. The directions given here apply to vertical capitals. The oblique down stroke would be a necessary change should these ideas be used in teaching an oblique alphabet.

The capital letters of the alphabet naturally divide themselves into groups that have similar construction and when attention is called to this similarity the pupil is well on his way to learning something of the alphabet. It is not the method which is new, tho some of the ideas about presenting it may be.

The numerals seem harder for the pupils to learn. The reason will probably be found in the fact that the young children print letters but neglect the numbers and fail to get any idea of the formation of a printed number. The confusion which they always have over the difference between the printed nine and the printed six or over the formation of the figure four seems to indicate that they have no sense of the formation of printed numerals. As soon as this fault is corrected numbers are printed as easily as letters.

The first group of letters depend largely for their success upon the straight down stroke of the capital I. Place after the I, the T, L, F, and E, and emphasize their likenesses and differences. Make one letter at a time and be sure that the pupils raise their heads to a reading position and discover the faults in the first letter before they make another. If they can be made to see the value of this procedure they will soon learn to make one letter over and over until it is reasonably perfect. The T has the cross which must balance on the down stroke, and the cross strokes on the L, F, and E will develop the first ideas of width.

The spaces between letters vary, of course, but with young people there must be a simple rule that applies to all letters alike. To make letters, in one word, just as close together as they can be drawn without touching; to leave room to see that the letters do not touch or room for a fine line to be drawn are all ideas suggestive of the space that should be

left between most letters. To actually measure a space takes too much time and is not very near what is desired in any case.

To realize the best width for letters is a new sense which must be developed, and continued measuring for the width of various letters does not do much to develop that sense. Show one letter very tall, one very wide and one just a little taller than it is wide. The last one will be the choice of the members of any ordinary class. Children have some sense of good proportion and need only the right suggestion toward following it. Without question the I will be given a little extra space and the W and M will be made a little wider than the other letters.

The second group of letters (H, M, N) still depends on the making of a good down stroke, but there are two strokes instead of one. The cross lines vary with different alphabets, but the vertical lines must be dependable. Where the center lines of the M seem a problem it may help to treat them as the upper half of an X. Pupils take to ideas of that kind.

The J and U have the down stroke but two-thirds of the way and are completed with a curve.

The group A, V, W may be considered the most difficult of all the letters to form correctly. These letters depend upon balance and pupils must learn to realize the axis. A vertical line for the center of either the A or V will help while two or three vertical lines may be needed for the W. The W is really a double V and does take more room than most of the other letters.

The next group (X, Y, Z, K) is composed of the straight line letters which do not fit exactly into any of the other groups. X will work out properly only when the limits of width are looked after and Y is but the upper part of an X with a down stroke added. If the top and bottom lines of the Z are made directly in line the connection is easy. K is harder. First the down stroke is made, followed by the upper oblique line and later by the lower oblique line, which must support the upper line, giving the whole letter the appearance of strength, instead of joining the upper line at the down stroke and making a very close belted effect. This whole group depends, as do all the letters for that matter, upon a careful defining of the rectangle, which, tho unseen, must bound all good letters.

The letters formed with curves have been

divided into two groups and one letter. The one letter is the S; the hardest and most fascinating letter for children as well as decorators. In the first groups are the letters which depend upon the original down stroke for support, and in the second are placed the letters which are entirely curved. P gives little trouble and the R, too, is not hard if the idea of using the short down stroke to support the loop is emphasized. When there is trouble with B it is well to draw a few well proportioned rectangles and practice the letter in these. D has a new curve which must be thought out.

The last letters are dependent upon a curve drawn from the top around to the left and bottom. After the curve is practiced the C can be made by extending the top and bottom. The G is but an elaborated C, O is the first curve repeated right as well as left and Q is an O with a tail to it.

S is as hard as ever. To begin at the top or bottom and complete the letter always brings poor results. If people can be taught to think of the S as two curves; a top one which is begun at the top and right and continued to the center while the bottom curve is begun at the left and drawn to meet the first curve near the center of the letter, some of the difficulties will be removed. In this as in the other letters the boundary lines must be remembered.

The numerals need not be grouped, but attention may be called to the resemblance and difference of the six and nine and to their likeness to the curve of the o and to the written six and nine. This last is a good memory aid.

A good conclusion for a lesson or series of lessons in the formation of letters is the printing of a motto. Here the distance between words, the filling of lines and other nice problems of page construction will appear and impress the need of a solution.

In so many cases the time for lettering is short and the pupils feel that when the lessons in which lettering is taught are over their need of careful attention to letters is past. Some help in avoiding this difficulty may be found in special attention to and elaboration of the lettering which each sheet requires. If a very definite place is given for the pupil's name, the date, the title and the name of the school and the teacher gives credit for successful placing of these, the pupils may be led to continued care.

In the work of art, man is the measure of all things.—*John LaFarge.*

A New Process—Waste Wax Castings for Jewelry

Louis J. Haas, Director of Men's Occupations, Bloomingdale Hospital, White Plains, N. Y.

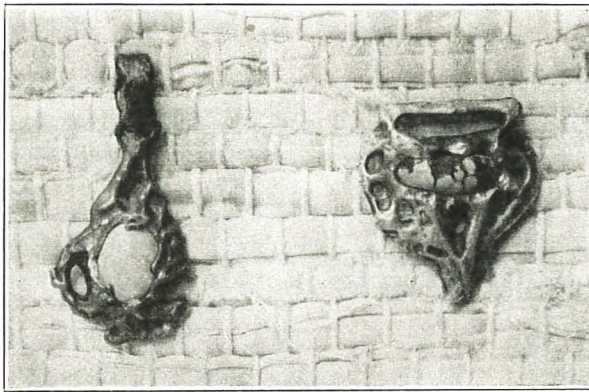


MOST craftsmen are familiar with certain processes of casting small objects as rings, pendants, brooches, etc.,—processes the use of which date back as far as we can trace the history of the jeweler's craft in the writings of certain craftsmen monks. Most workers who are familiar with these processes also know their limitations and to just what degree the craftsman is handicapped by them.

There are two processes in general use among craftsmen. First the fish cuttle mould, which is made by pressing a model blank half way into a piece of fish cuttle that has been surfaced for the purpose. The key pins are then placed and the other half of the model pressed into place. The mould is now separated, the ring or other form removed, air vents and a gate are made with a knife; the two halves are then tied together, the metal is melted in a crucible and poured into the mould. Two, three and four-part moulds can be made as the model requires. The result is usually a good blank ring or a fair result from a crudely modeled ring. Because of a certain amount of animal matter in the composition of the fish cuttle which burns out when the molten metal reaches it, no clearly defined detail can be hoped for. Such castings are at best blanks from which by filing, carving and chasing, the finished article is produced. The other process is that of making a mould in very fine moulders' sand in a small flask, a process that hardly needs any further description. The molten metal is poured into this flask mould from a crucible. The results are much better. In the hands of a skillful moulder very good detail may be obtained. But even these castings are retouched by chasing to get the finished detail desired.

Both methods require for such work as jewelry a metal model from which the mould can be made. Where the piece is a new design this model must first be made, and unless more than one is desired, little is gained by casting. In fact, the result is often more easily obtained by other methods.

For a number of years dentists have used the vacuum system of casting in a one-piece mould made from wax models of fillings, and more recently such fillings have been cast in a one-piece waste wax mould by a process that uses self-formed steam pressure to induce the melted metal to fill the partial vacuum of the heated mould. The writer experi-



Lavalieres Cast by the Author's Process.

mented for a few years, adapting this last named process to the use of the craftsman jeweler with gratifying success. By this process the limitations as to detail, especially of undercut modeling, were removed. Any type of detail that could be modeled could be cast with minute exactness. Another advantage was that wax models were easier and took less time to make than metal ones, therefore it was both practical and profitable to make original designs by casting where only one was wanted. The only drawbacks were the necessity of having expensive equipment and the difficulty of making and casting very large moulds. It was after adapting this process to his needs, but realizing its limitations, that the writer asked himself: Why could not a one-piece mould be poured from a wax model, a mould into which metal could be poured from a crucible, but a mould which would give all of the detail of the pressure system of casting? The answer was because there was no way for the air to escape so that the metal could completely fill the mould. Finally, a way to get rid of the air in this type of mould presented itself, and this process of waste wax casting was found after experience to give the results desired. The process of both making the models and moulds and casting, was described first in the little book, "Art Metal Work and Jewelry," from which the Plate I is taken.

Two difficulties were encountered: First, to keep the mould and the crucible hot during the process of pouring; second, the great amount of precision which the pouring of the metal in this type of mould required. The slightest break or decrease in the stream of metal while making the pour would always mean the loss of a mould. Further experimenting has shown ways of eliminating these difficulties and has proved the usefulness of the process to the craftsman. The belief that the process would be of value to others, has tempted the writer to undertake a detailed description of the method of making the model, mould and the casting, presenting the following few examples of just one of the types of jewelry which may be made in this way.

Suppose we wish to make a small pendant or lavalier. The design may be left to individual taste, altho experience will soon teach that designs which employ the plastic effects which this process produces so truly are best. First, upon a piece of sheet iron 3"x3" and about No. 22 gauge, build a

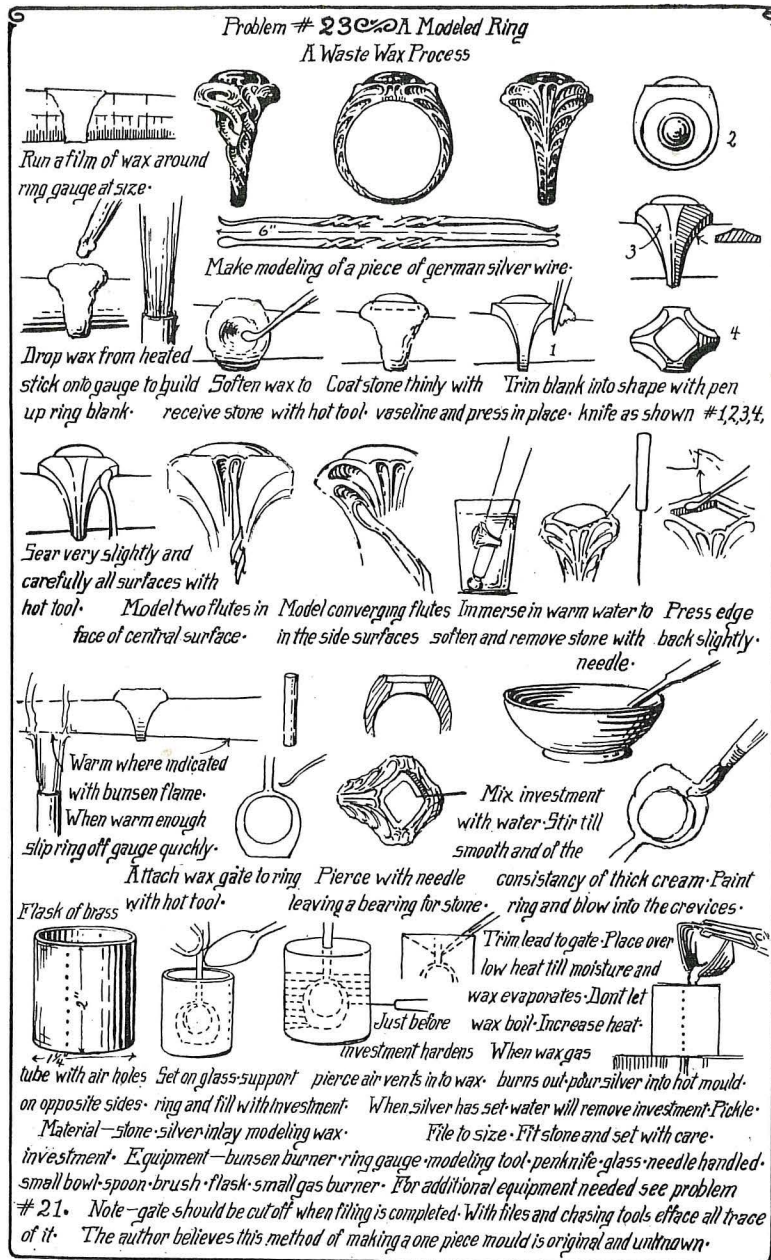


Plate 1.

rough blank of gold inlay modeling wax, by heating the stick of wax over a bunsen burner and dropping the wax on the plate. The plate is then heated to cause the wax to smoothly adhere, and the building of the blank is continued by dropping on more and more wax, allowing it to cool a second after each deposit. This is continued until the blank is of the required size and shape. Of course, a margin of wax is allowed for the trimming and refining of the blank form.

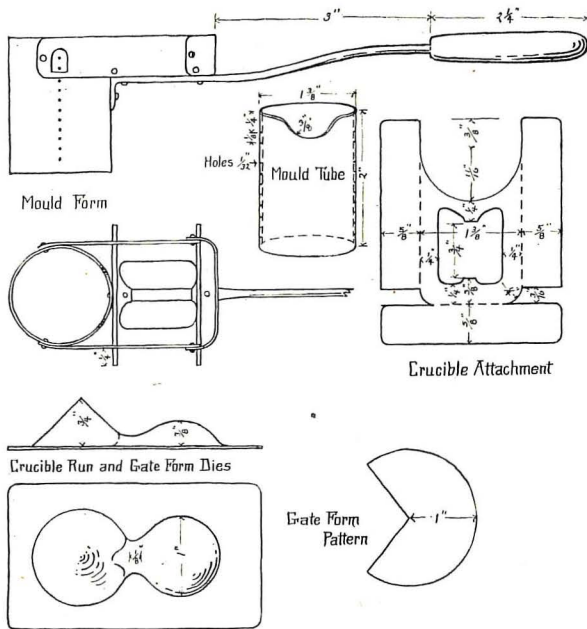
A pen knife and the spatula described in Plate I are the only modeling tools required. Such a tool cannot be bought, but anyone who is at all dexterous with a file can soon shape one out of a piece of $\frac{1}{8}$ " tool steel. The little spoon-like ends must be perfectly shaped and then polished true, smooth and bright with a hand buff or a felt wheel.

Now prepare the stone by rubbing on it a thin coat of machine oil to keep it from sticking too firmly in the wax. This is easiest accomplished by putting a drop of oil on the first finger and revolving the stone between it and the thumb. Now take the spatula and heating it repeatedly in the bunsen flame, use it to liquefy the portion of the blank which is to receive the stone. The stone may then be pressed firmly in place, taking care to get it level and placed at the desired depth in the wax. With the hot spatula, bring the wax up to the stone, seeing that there is enough wax to hold the stone as firmly in place as desired.

Then the modeling of the design may be undertaken. First, with a pen knife, trim the blank into the rough form. Take the tool and warm it just enough to make the wax pliable when it is touched by the tool. It will take some experience to know when the tool is just hot enough to work with. This will come from noting carefully how the wax acts under the tool at different degrees of heat and by trying to fix in the mind the fraction of time it takes to warm the tool to just this right temperature. The modeling is not done by carving but by modeling the plastic wax with the tool. When the tool is just at the right temperature, it may be passed over the surface of the wax lightly, just searing it. Then if a little more pressure is put on the tool, the wax ripples away on each side of it and chills at once, retaining all of the interesting accidental shapes it took while the wax was plastic and in motion. When

in this condition the wax answers to every variation of pressure on the tool. With experience one gets to know all of these possibilities and knowingly weaves them into effects which can be obtained in no other way. When in this condition, the wax can be pushed about at will, so that the experienced craftsman has at his disposal a most expressive medium. He may use all of its many little textural effects and he may make it answer to his own imagination or creative conception. Thus, leaves and flowers, waves and seaweed, conventional or realistic, may be produced as desired.

When the modeling is completed, the next step is to remove the stone. This is done by immersing the wax model in a bowl of hot water until the wax becomes just pliable, then with a needle held firmly in some sort of handle, (possibly a small pin vise)



Plates 2 and 3.

the stone may be removed by inserting the needle under one corner of it in a way not to mar the modeling and lifting it gently up and out of the wax. To do this successfully, the wax must be just pliable enough so that it will give and not crack as the stone is lifted. For this purpose the water must be nearly as hot as the hands can stand comfortably, to make the wax pliable in a few seconds and yet not hot enough to sear the wax, for if this should occur, all the modeling will be lost. This temperature can be determined by experimenting with a piece of wax modeled for the purpose.

After the stone is removed the mounting may be stretched ever so slightly. It is a known fact that the casting shrinks and is not quite as large as the model from which it is made—therefore the stone will not fit after casting unless the wax mounting is stretched. This is done by immersing the model again in the hot water until the wax is pliable. Then, having warmed the tool in the water also, with it gently push back the walls of the mounting the slight amount required. Having done this, examine the walls of the mounting to ascertain that they are not cracked in the slightest degree. In case this has occurred they can be repaired by searing slightly with the warm tool. The model is now ready to remove from the iron plate. To do this, heat the plate slightly from underneath with the bunsen flame until the wax form will slide off into the palm of the hand, where it may remain until cool. The wax gate is now attached. This is a small stick of wax about $\frac{1}{8}$ " in diameter and about $\frac{1}{2}$ " long and is attached to the top of the pendant by searing the joint carefully with the tool. Place the gate so that it will not mar the design. The piece is now ready for the mould.

As the mould forms or type of flasks that must be used in making these moulds cannot be bought,

the accompanying drawings are thus explained: Take a piece of $1\frac{3}{8}$ " diameter brass tubing and cut to length, then draw two lines down the sides of the tube, having them directly opposite each other. On these lines drill a series of holes with a 1-32" drill, spacing the holes $\frac{1}{8}$ " apart. At the top edge of the tube and just in the center between the two rows of holes file or saw out a $\frac{3}{8}$ " arch. Then, as shown in the pattern, cut out of a piece of 18-gauge brass the crucible attachment. Bend this up into shape on the dotted lines, rivet the laps at the corners and then rivet to the tube or cylinder. Make the handle of a piece of 3-16" wire, fit a wooden handle to one end of this, flatten slightly the other end and rivet in place to the crucible form attachment. Now drill two 3-32" holes on both sides of the crucible attachment at the points designated in the drawing and insert thru these two tight fitting headless wire nails, leaving them projecting about $\frac{1}{4}$ " out on each side of the form. It is on these nails that the mould form rests upon the tipping or casting stand. From a piece of 18-gauge brass make the tipping or casting stand by bending up into shape on the dotted lines as shown in the drawing. Now make the crucible, run and gate form dies of two pieces of 22-gauge copper. The gate is simply a small funnel or cone, while the crucible form and run is embossed up out of a piece of copper to the shape shown by the drawing. These two pieces are shaped, trimmed and soft soldered to a flat plate of 18-gauge brass. Having the mould form or flask with crucible attachment and the crucible, run and gate die forms we can proceed to make the mould.

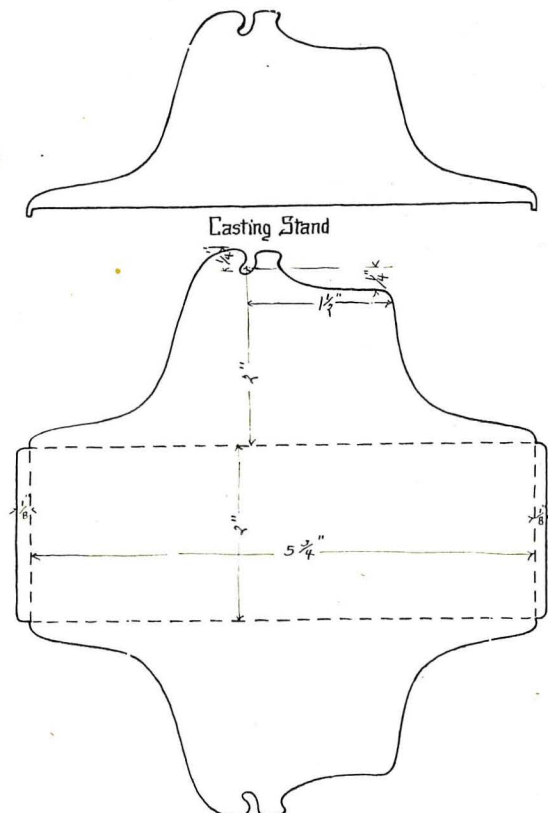
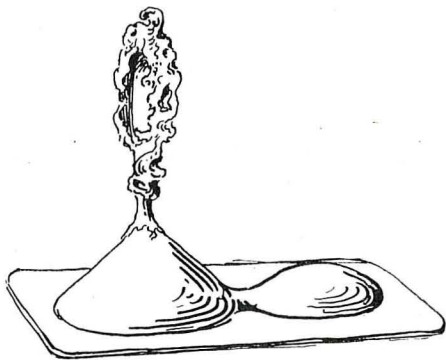
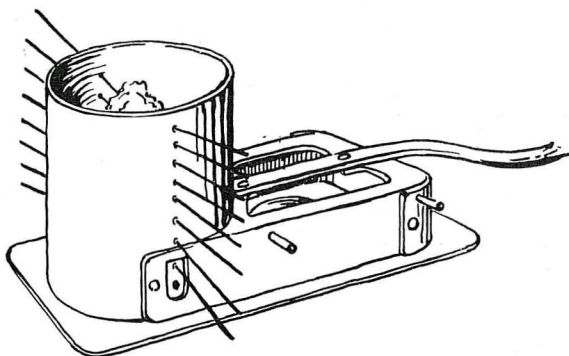


Plate 4.



Model attached to Gate Form and ready for the Investment



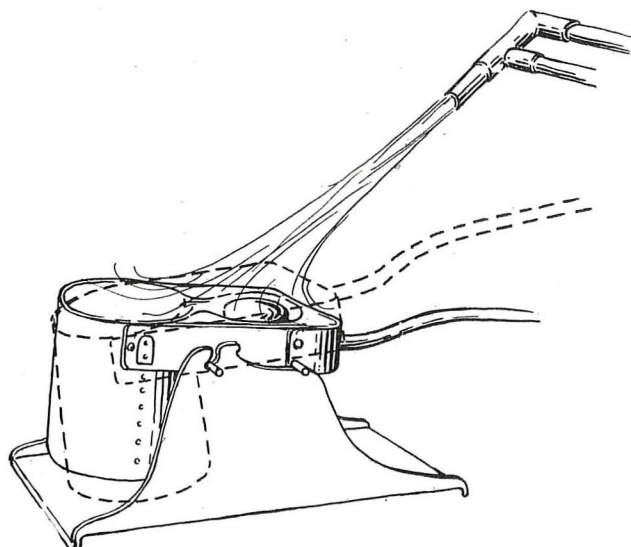
Mould Form in place with needles inserted ready for Investment

Plates 5 and 6.

With the heated tool attach the model to the gate form by searing the wax gate until it firmly adheres. Take the fluid inlay investment of which the mould is to be made, and mix a small quantity to the consistency of very thick cream. With cold water and with a soft brush paint this over the wax model, working the investment carefully into all of the crevices of the modeling, taking care in doing this not to enclose any air bubbles, by frequently blowing the investment after being placed with the brush. Blowing with a certain pressure will work the investment into places that the brush will not reach. Every care should be taken to do this part of the work as carefully and perfectly as possible as on this depends good detail. Two or three thin layers should be applied when it is ready to place in the mould form. The mould form is placed over the painted model and is cemented fast to the plate with a bit of plasticene modeling clay. Now take a number of No. 1 sewing needles and, heating the points, run them thru the holes in the side of the mould form and a slight way into the wax model, passing thru the layers of investment. This must be done carefully. It can be told when the needle enters the wax; the needle being warm shows just a line of wax around the point where it enters the investment as soon as the wax is reached. Space the needles evenly along the sides of the model thru the holes in the mould form, using eight or ten of them, or in the case of large models, more. Now mix up a quantity of the investment in cold water, making it thick enough in consistency that it just can be poured into the mould form, and work it down and

around the model carefully with the brush, taking care not to enclose any air bubbles and filling the form up to the edge. Now thru the hole in the back of the crucible form fill this, working the investment into the corners well and avoiding here also the possibility of enclosing air bubbles. This being accomplished let stand until the investment has set quite hard. This may take an hour or more, according to the consistency of the investment used.

When the investment has set hard the mould is removed from the plate containing the gate, run and crucible die forms by tapping the plate lightly with a mallet. The plasticene is now removed and the mould is placed on a stand or support over a low flame of a bunsen burner to heat. Until the moisture is evaporated the heat should be applied very slowly, then gradually increased. Then as the mould starts to warm, the wax will sink into the mould and in the case of large models the wax may be poured out and saved to use again. The mould must now be removed from the fire and with a pair of flat pliers carefully remove all of the needles. The holes left by removing the needles furnish the vents thru which the air escapes when the silver or gold is poured into the mould. On the right number of needles in relation to the size of the model and the careful arranging or spacing of them depends the successful casting of the model, the sharp, clear and exact reproduction of the detail. The mould is then replaced over the flame. Care must be taken at this stage not to have sufficient heat to cause the wax to boil, as this would destroy some, if not all, of the detail of the mould. Therefore it is well to watch closely for any action within the interior of the mould. This may be observed thru the gate of the mould. Should any wax suddenly rise and appear in this gate it is about to boil, and the mould should be taken at once from the fire and allowed to cool. After the mould has cooled for a few seconds it is returned to the stand and heated.



Making the casting Dotted lines show how mould is tipped

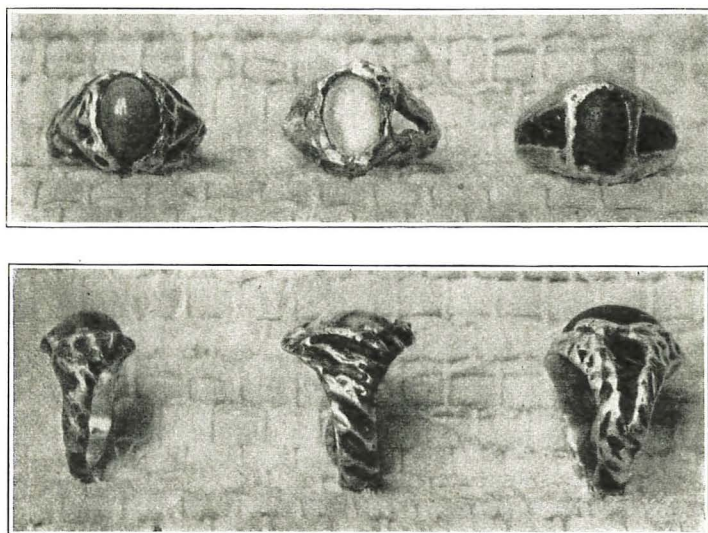
Plate 7.

slowly. When all danger of the wax boiling is past, the heat can be increased and the mould heated until it is completely burned out. This is ascertained in this way: As the heat in the mould increases a thin line of pale smoke or gas arises from the gate of the mould. After a short time this changes to a small flame which burns for a while and then goes out. The mould is now ready to cast.

Set the mould on the rest and place in the crucible hollow, a lump of silver or clean silver scrap to the quantity of at least twice the bulk of the model. Heat this with the flame of a blow-pipe held at an angle which will at the same time melt the silver and keep the mould hot. As soon as the silver is hot,

the back only of the casting is polished. A slide loop may be made of a piece of sweated silver which will harmonize well with the pendant. This is fitted loosely into the opening at the top of the pendant and the two ends of the loop are then soldered together so that the loop may move freely in its place. The stone can now be set. If the mounting is too small, it may be carefully enlarged with a graver. The setting is accomplished by pushing the walls of the mounting in place against the stone with a flat faced chasing tool, taking care not to mar the surface of the silver.

The finish may remain the frosted white which the acid leaves it after pickling, or it may be oxidized in a solution of liver of sulphur and then the modeling



Rings Made by Mr. Haas.

add to it a pinch of powdered borax and continue the heat until the silver is a liquid and seemingly boiling. Now without removing or diminishing the flame from the silver, take hold of the handle of the mould and raise it steadily and quickly, just enough so that the silver may all run from the crucible hollow thru the run, into the gate and down into the mould. Hold in this position a few moments until the silver congeals or sets; then immerse the whole mould in cold water, which will dissolve the investment and allow the cast to be examined. Pickle out the cast in the usual bath of one part sulphuric acid in ten parts of water, by boiling the piece in the acid solution, contained in a copper vessel, and finally rinsing in water. Any remaining investment may be removed with the wash-out brush and water. Next the back of the casting is filed and smoothed with emery. Now cut off the gate carefully, retouching just this cut surface with files and chasing tools to make it harmonize with the rest of the modeling. Finally,

enhanced by rubbing with the finger tips containing a bit of rouge or fine tripoli to lighten up the high places. Wipe clean with a soft cloth and the piece is ready to wear.

Every care should be taken in all work that is done to the cast, to in no way touch, mar, or change unnecessarily the texture of the modeled surface.

This texture has a distinctive beauty, which comes only in the modeling and casting, but once lost or marred, cannot be reproduced by any method.

The beginner with this process of casting must not be discouraged by losses at first. These may be due to such causes as not having the silver sufficiently moist at the moment of casting, or not tipping the mould in such a manner as to get a steady, continuous and full flow of silver into the mould, or by not having enough air vents or by not having them arranged correctly. But experience and care in preparing the mould and casting will give success.

Practice Teaching at the Stout Institute

R. H. Rodgers, Supervisor of Practice Teaching

Purpose of Practice Teaching at the Stout Institute.



PRACTICE teaching is now recognized as an essential in the training of a teacher. The Stout Institute is organized expressly for the purpose of training teachers of the Household Arts and the Trade and Industrial subjects. Definite experience in meeting the teaching problems involved in these subjects is given a very important place in the work of this institution and years of experience have verified the soundness of the practice in this aspect of the training. In the description of the training work carried on which follows, the trade and industrial subjects are the only ones considered.

The Amount of Practice Teaching Required.

As a requisite for graduation from the two-year course every student without previous teaching experience must have a minimum of 27 weeks, 10 hours a week, or 270 hours of practice teaching. The majority of students receive 36 weeks of this work or a matter of 360 hours. Students with teaching experience must take at least nine weeks or 90 hours of practice work. This experience is in every case with normal sized classes and includes the organization and management of the class in a manner typical of the best classroom procedure.

Organization of Classes for Practice Teaching.

All the school facilities of the city are utilized thru close co-ordination for this practice teaching work.

The Public School provides classes as indicated in the table which follows:

Grade	Subject	Subject	Subject	Subject	Minutes per week
First.....			Primary handwork		150
Second.....			Primary handwork		150
Third.....			Primary handwork		150
Fourth.....			Primary handwork		150
Fifth (3 Sec.).....			Bench woodwork		180
Sixth (3 Sec.).....			Bench woodwork		180
Seventh.....	Arch. Draw.	Plumbing	Carpentry	Masonry	450
Eighth.....	Mech. Draw.	Printing	Forging	Cabinet Mkg.	450
Ninth.....	Painting	Wood Turn.	Freehand Draw.	Joinery	450
Tenth.....	Mach. Draw.	Pattern Mkg.	Foundry	Mach. Shop	450

Electives.

Eleventh.....	} Advanced work in the subjects given in the Seventh, Eighth, Ninth and Tenth Grades.....	450
Twelfth.....		

Special classes afford the following additional facilities:

School	Subject	Subject	Subject	Subject	Minutes per week
Parochial.....	Mech. Draw.	El. Cab. Wk.			180
County Tr. School....		Woodwork for rural school			360
Continuation.....	Painting	Cabinet	Printing	Mach. Shop.	180

The total number of classes available is thirty-seven, twenty-one of which meet daily, ten twice a week and six once a week.

Assignments for Practice Teaching and Observation.

Two students are required to elect a practice class which in every case is for a period of 9 weeks, $4\frac{1}{2}$ of which is spent in teaching and $4\frac{1}{2}$ in assisting observation. The students are encouraged to select

those classes for which they have made definite preparation. Previous to taking charge of any class the student must observe work of the class for at least one week. The chart which follows below indicates an effective method for making the assignments for each quarter and for each class.

Students' Preparation for Teaching.

The students in their junior year, during which time no practice teaching is taken, pursue the subjects of Psychology, which includes lesson plan making, and Studies in Industrial Education. In their shopwork at first, time is spent on required acquaintance courses followed by specialization courses. In the senior year the students have work in Methods of Teaching and the Organization of Manual Training. These two courses precede or parallel the actual practice work in teaching. The shopwork of the senior student is entirely specialization which fits him for taking up and handling effectively the various practice classes.

Preparation of Daily Work.

In preparation for class teaching from day to day, a lesson plan is made use of and followed closely.

The elements or propositions which make up the lesson plan are:

I. The teacher must have clearly in mind the purpose or purposes to be realized in the class period.

II. The teacher must have clearly in mind what must be known and done in order that the purpose or purposes may be realized.

III. The teacher must determine what of the

things that must be known and done the pupils now know and can do.

IV. The teacher must determine the things remaining to be known and done and the order in which they shall be known and done.

V. Method of presentation.

Under proposition I, the purpose or purposes should be stated clearly and directly to the point, using as few words as will adequately express the aim of the teacher. Propositions II, III, and IV include the complete analysis of the problem to be taught and also the organization of the material into its logical order. It might be compared to a sifting out process, leaving as a residue under proposition IV only those things which the teacher must present and the order in which they will be taken up. Proposi-

tion V is concerned with the method of presentation—that is, how the teacher brings the material to be taught—before the class for instructional purposes. This requires a good working knowledge of the principles of teaching and the numerous pedagogical kinks and devices.

In general, a presentation on the part of the teacher may be made in any one of the following four ways: (1) by means of a lecture or talk, aided, possibly, with illustrative material; (2) by the developmental method, using either the inductive or deductive approach; (3) a demonstration by the instructor before the class for the purpose of illustrating a good practice or new processes; (4) a combination of the three methods enumerated. This latter might be termed the objective-developmental method. It takes the demonstration, which is fundamental in teaching industrial processes, and supports it with good, clear-cut explanations in the form of a lecture or talk, and further strengthens it by the use of carefully selected questions, thus concentrating attention and taking into account self-activity on the part of the student.

The lesson plan which follows is a type of what is used in the preparation of all plans. Some of the plans used cover a complete problem, in which case they are called "unit plans." Others cover only a portion of a project or exercise, and are known as "day plans." In this connection every project is

I. Purposes:

1. To have students understand the correct method of sharpening the gouge and skew chisel.
2. To have students gain experience in doing the same.

DAY LESSON PLAN.

First Year High School Wood Turning.
Sharpening of Tools.

SCHEDULE OF PRACTICE CLASSES										YEAR 1916-17		
WEEKS	1 st Grade	2 nd Grade	3 rd Grade	4 th Grade	5 th Grade	6 th Grade	7 th Grade	8 th Grade	9 th Grade	2 H.S. Mach. Shop	3, 4, H.S. Masonry	3, 4, H.S. Printing
1-9	Larson	Jones	Hamilton	Voss	Gifford	Hagar	Sprague	Scott	Roberts	Donald	Lamb	
	Williams	Andrews	Becker	Adams	Elfinger	Edlitz	Br.	Mullica	Kruck	Tews	Hughes	
10-18	McLean	Langer	Cocher	Newport	Olson	Smith	Gayles	Docker	McIntosh	Proger	Knoop	
	Cook	Kirsh	Wilson	Brown	King	Bl.	Mulder	Nelson	Dickert	Supple	Hiler	
19-27	Purdy	Rautio	French	Rosse	Robinson	Green	Newcomb	Hould	Doyle	Thompson	Hummel	
	French	Cooper	Carlson	Cripe	Buss	Barnett	Shumway	Feist	Romera	Murphy	Blum	
28-36	Schaefer	Berger	McNary	Ehrhard	Em	Gamble	Sanger	Larson	Franklin	Lampert	Hasse	
	Hintz	Owen	Mahr	Kel	Klampe	Leland	Myers	Rand	Dahlgren	Nelson	Peterson	

Diagram Showing Schedule of Practice Classes at Stout Institute.

II. What must be known and done:

1. The process of grinding on the emery wheel is as follows:

a. The skew chisel is held against the revolving emery wheel so that its edge is about horizontal, and the bevel kept about $\frac{1}{4}$ " to $\frac{3}{8}$ " in length.

b. The tool is passed slowly back and forth across the surface of the stone, grinding the bevel the same all the way, first on one side and then on the

SCHEDULE					
Supervisor	Rodgers.	Year	16 -17	Semester	2
1 ³⁰ -2 ⁴⁵ PERIOD					
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
5 th Grade	1 st Grade	3 rd Grade	H. S. mach. Shop	H. S. Joinery	
H. S. Woodturning	2 nd Grade	4 th Grade	H. S. Masonry	H. S. Forging	
6 th Grade	H. S. Painting		H. S. Printng	H. S. Furhand Dr.	
2 ³⁰ -4 ¹⁰ PERIOD					
8 th Cabinetmktg	7 th Masonry	7 th Carpentry	8 th Forging	H. S. Patternmaking	
7 th Arch. Dr.	7 th Plumbing	County Tr. School	H. S. Mach. Shop	H. S. 8 th Printing	
8 th Mach. Dr.	H. S. Mach. Dr.	Parochial	H. S. Foundry	Conferences	

Schedule of Subjects Taught in Practice Classes, Stout Institute.

other. The pressure should not be great or the tool will burn.

c. The point of the tool should be cooled in water often.

d. The gouge should be held in the manner that will allow of turning with the right hand to keep the bevel on the end the correct shape. The shape of the end of the gouge should be semi-circular.

e. Care should be taken to keep the bevel of the gouge about the same as that of the skew.

f. For soft wood turning the bevel may be longer than for the turning of hard woods.

2. The skew should be sharpened next on the oil-stone, working from each side until the feather edge has disappeared.

3. The gouge should be whetted on the large oil-stone, or preferably with the slip-stone, to obtain a good edge. With the rounded edge of slip-stone the inside wire edge of the gouge may be removed.

4. For the finishing touches to both the skew and the gouge, the slip-stone and a little oil should be used: the flat sides of the stone being used for the skew and the outside of the gouge, and the rounded edge for the inside of the gouge.

5. It is the mark of a good workman to have his tools always in a good, sharp condition; the quality of the work is much superior when done with sharp tools than when done with dull ones.

III. *What the students know and can do:*

Points enumerated under No. 5, Prop. II.

IV. *Things remaining to be taught, and their order:*

Points enumerated under Nos. 1, 2, 3, and 4, Prop. II.

V. *Method of presentation:*

1. Instructor demonstrates the method of sharpening the tools on the emery wheel, and cautions the class about the dangers of burning. Informs class that the bevel for the skew and gouge should be about $\frac{3}{8}$ ". The tool should be passed slowly back and forth across the stone, so that the bevel is even all along. Both sides of the tool should be the same. The gouge should be turned in the hand, thus keeping the bevel even all around. Informs class that bevel on tools for soft wood should be longer than for hard woods. Questions class to know if any can explain why.

2. Demonstrates method of sharpening skew and gouge on the large oil-stone or with the slip-stone. Each bevel of the skew should be worked on the stone until the feather edge has disappeared. The outside of the gouge should be worked on this stone, and the inside sharpened with the rounded edge of the small slip-stone.

4. Demonstrates the finishing touches of the sharpening of both the skew and gouge with the flat and rounded parts of the slip-stone.

Following the preparation of a lesson plan for a day's work the practice teacher must submit it to the critic for approval. This requires a conference

and a careful checking over by the critic of just what the practice teacher expects to do. The carrying of a practice class counts as one subject and as such goes in to make up the regular day's program.

For the general guidance of the practice teacher two sheets of directions are placed in his hands.

I. GENERAL INSTRUCTION SHEET.

Class Management.

A typical program is presented which is to guide the practice teacher during the class period in the shop.

Preparatory Work.

Preparation of lesson plan and organization of subject matter for presentation.

Getting tools, machines, general equipment, and material in condition and available for immediate use.

Presentation Period.

Class quieted, roll called, work and tools distributed if necessary, students seated for demonstration or lecture.

Brief review, if work of the day is a continuation of that of previous day, for purpose of focalizing attention.

Presentation of new material by illustrated lecture, developmental method, or demonstration.

Summary of presentation, and recitation by students, to clinch main points.

Directions and assignment for the work of the period.

Class Work Period.

Taking up work by students in an orderly manner.

Follow-up work by teacher giving individual assistance.

Checking of results by the teacher.

Dismissal Period.

Putting away work and tools by the students.

Cleaning up equipment and room thru assigned duties.

Orderly dismissal of class from the room or building.

II. GENERAL DIRECTIONS FOR PRACTICE TEACHERS.

A. *Lesson Plans:*

1. Practice teachers should carefully study the model lesson plan and make their plans conform to it very closely.

2. Lesson plans must be submitted previous to teaching any classes, also a conference should be held with the critic concerning the work covered by the plan.

3. All lesson plans are filed in the Supervisor's office and may be secured at the close of the year.

B. *Conferences of Practice Teachers with the Critics:*

1. Every Monday at 4:15 practice teachers are required to attend a conference with their critics for the purpose of a general discussion of the problems of teaching.

tion. In connection with this work he shall be required to make a daily written report. The observation schedule will be in charge of the Supervisor.

VI. *Outlines of Courses for Public School Classes.*

1. Outlines for the entire work of the nine weeks' courses should be in the hands of the Supervisor at the close of the first week of school.

VII. *Teaching by Critics.*

1. Each critic shall take charge of his practice class for an entire period at least twice during every nine weeks for the purpose of demonstrating good teaching.

VIII. *Grading of Public School Classes.*

1. Each critic should have practice teachers keep an effective record of both attendance and grades in a permanent book. This record book should be preserved for future reference.

2. Critics should personally see that the individual record cards which will be presented later are correctly and adequately filled out. The purpose of this information is to direct or advise boys in the selection of a vocation.

IX. *Procedure in Handling Public School Problems.*

1. In all matters pertaining to the practice teaching with the public school classes such as schedules, grades, reports, absences, consult the Supervisor, who will, if found necessary, take up the details with the school authorities.

Conferences.

As indicated above daily conferences are held before a teacher steps into a classroom. In most cases conferences are also held following the particular lessons. Further, weekly conferences are held by the critic teachers in which general problems of the specific class are discussed. In addition to these the supervisor holds monthly conferences, taking up the general problems included in the methods of teaching the various trade and industrial subjects.

THE REMINISCENCES OF A HIGH SCHOOL DRAWING TEACHER

Maude M. Miles

SKETCHING.



ACCORDING to the course of study laid down for us, the work of the last two weeks was "Sketching." This was true of all drawing classes, of every kind and grade.

"Sketching," in our school, does not mean landscapes from nature, as a stranger might suppose. Sketching, with us, means drawing the clothed figure from life. In a school I visited twelve years or more ago, the teachers required the students to make sketches of each other, always representing the one who posed to be a person possessed of a head, absolutely bald. I was sorely puzzled to see a beautiful girl posing before the class, with fluffy hair and

PRACTICE TEACHING REPORT		
Student.....		Subject.....
Grade.....		Date.....
LESSON PLANS	Punctuality.....	Appearance.....
	Subject Matter.....	Organization.....
	Suggested Method.....	English.....
CLASS MANAGEMENT	Efficiency.....	Discipline.....
	Standards of Work.....	Interest.....
	Discipline.....	
PRESENTATION	Method.....	
	Demonstration.....	
SHOP MANAGEMENT	Condition of Shop.....	
	Care of Equipment.....	
PERSONALITY	Habits.....	Attitude.....
	Appearance and Address.....	
		CRITIC TEACHER

Critic Teacher's Report Form.

Grading.

Students are given weekly written reports by the critics which indicate their success or shortcomings for that period. Quarterly reports in duplicate, one for the student and one for the supervisor, are also made out. The form which follows will indicate its character. From this quarterly report a summary is made and passed in, in the form indicated below.

Summary.

In submitting this organization of practice teaching accompanied by the various forms it is with the knowledge that it has given effective results covering a period of three years. It will be noted that no artificial conditions surround the work of the young teacher. In every case the classes are normal and are running under typical public school conditions. A student confronts and works with the actual teaching problem, a thing which is absolutely necessary in the effective training of teachers. He furthermore is afforded a wide range of work and is given at all times close supervision and the maximum of assistance.

many curls, represented as if she were bald. The comic advertisement for "Herpicide," entitled, "Going—Going—Gone," was no more bald in the "Gone" picture than the required sketches of this beautiful girl.

"Why in the world do you make them all bald-headed?" I asked one of the teachers. "In order to show them the structure of the head," said the teacher. "But you don't draw them nude," I said. "You represent them as you see them, with their clothes on." "Mercy!" exclaimed the teacher in horror, "what ridiculous criticisms you do make." "Well," quoth I, with fine disregard of grammar, "if they draw them with their clothes on, because they see them that way, I cannot for the life of me

see why they should not also represent them as they see them, with their hair on their heads."

Right from the start we allow the children to sketch each other and represent them, as best they can, with hair on their heads. Whenever a drawing is so good that you can tell it was intended to be a human being, it is a comfort not to have them any more unsightly than the child makes them by his inability to draw. But those teachers who insisted on bald heads were decidedly right about one thing; the student should be induced to see that there is such a thing as structure, in the human head. My way of impressing this upon them differs considerably from theirs, and it may be that I differ from anyone else. So far as I know, I do.

Our first lesson in sketching was a study of any snake I could get that was so arranged in his bottle of preservative that we could see the shape of his head. We progressed, and tried our hand at drawing lizards, salamanders and other similar creatures which had legs.

Then, home drawing was required. Everyone was required to draw a dog, cat, horse, monkey, or other beast, either at home, in the "pet" shops, or in the city "zoo." The next Monday morning the classes found a skeleton dangling before their eyes and were told to draw it.

They were not told to count the bones nor to draw each one. They were told to observe the shape of the brain box and the poise of the head on the end of the spine; to consider the spine like a tree trunk, and the legs, arms and head all as limbs or outgrowths from that trunk. I brought out three skulls and asked the class to compare them. The first was the skull of a coyote with its long muzzle and low brain box. We spoke of the monkey and the other animals which the students had drawn and compared the drawings and the facial angles in the various heads. Then the skull of a negro and the skull of a white man were placed before the class, and they were asked to point to the skull of the negro. Not a pupil in any class hesitated. Everyone already knew too much about the structure of the head to mistake the skull of a negro for that of a white man. By this I mean that my difficulties were at an end. It takes weeks and months and sometimes years to make a student see that the human head has a certain and definite structure.

When I have finally induced a pupil to draw heads that are not shaped like bullets, two-thirds of my work in teaching him is ended. When he can see the brain box and the muzzle as easily separated into two related parts of a concrete whole, he has progressed and he needs but little tutoring, as he grows of his own volition.

In the past two weeks we have not attempted to draw a single head of a human being. The pupils were not allowed to draw longer than one period on one drawing of the skeleton, but were

allowed to make several attempts if they wished. The mistakes in their drawing were always mistakes in structure and the more they elaborated upon these, the worse the drawing became. "Begin again and again and again; keep the mind on the big things" is the way to study anything like that. This is the big fundamental thought that the teacher himself must keep in mind; the thought that he is teaching the child and not the piece of paper. Even as the teacher grows interested in the actual drawing itself and loses sight of the soul she is trying to awaken, so the child loses sight of the big proportions of the whole structure and over-emphasizes and enlarges some unimportant detail.

I am always quoting an old story to my pupils. It is the story of a black man who was posing for a class of art students. The teacher went around the class saying, "Keep in mind the big things, leave detail to the last." The old darkey thought he had grasped the idea and, one day, he supplemented the professor's remarks by saying, "Why, yas of course de tail always comes after de dog." A foolish yarn, like this, enlivens the class and helps to make them see the point.

I do not believe it is time wasted on the part of the teacher when she talks to the class if she manages to say something worth while when she is talking.

Another week has gone by and the freshmen classes are learning to draw circles, on their eye-level, above, and below. The idea that they have an eye-level and that it controls the way things appear to them, is a new idea to many of them. Not only the first-year classes, who are drawing the circles, are being impressed with the eye-level, but even the life class, who go on with the sketching; for the eye-level is brought to their mind every day. It is the fundamental principle of perspective that level planes grow more and more foreshortened as they approach the level of the observer's eye, and that any level plane, of any size or description, appears as a straight line when seen on the level with the eye of the observer. In drawing the head, the slant or curve of the line thru the features is controlled by this same principle.

We have a large wooden ring, about twelve inches in diameter, with a concentric circular hole, about two inches high and about eight inches in diameter, bored thru the center of it. This we suspend by linen threads from the ceiling, in order to study it. It is always a surprise to the student, and a puzzle too, to be told that the lower circle is wider when the object is below the eye, and the upper circle is the wider when the object is above the level of the eye. This is the same old drill that is always given in every school and I think a little of it is good discipline, but I think it is a mistake to turn the whole course of study over to this sort of thing and make the "art course" a dull and dreary grind.

(To be continued in October).

PERIOD STYLES IN FURNITURE

Conrad Weiffenbach and Anton Anderson

Third Article

HOW TO MAKE A WILLIAM AND MARY STOOL.



THE demand for period furniture of simple outline and construction is rapidly increasing. The time has come when teachers of shopwork are beginning to satisfy this demand by introducing their classes to furniture styles other than "straight line."

The William and Mary style is probably the most popular of all the period styles which are now being reproduced. The particular characteristic of this style was described in the July and August issues of *The Industrial-Arts Magazine*.

The stool illustrated in the accompanying drawings was made by a pupil of the Buffalo Technical High School and may be reproduced by students in any manual training shop which is equipped with a turning lathe. The woods which may be used are oak, walnut, gum, mahogany and white wood. The last mentioned wood is enameled.

The method of making is as follows: Make a full-size drawing of the stool; draw one-half of front view in black ink, a full side view in blue ink and one-half of the plan of top view in red ink. This is the standard method of furniture drawing used thruout the furniture industry. Cut out the stock called for in the stock bill, square the legs and glue on the blocks for the extra thickness to conform with the drawing.

To turn the four legs exactly alike, it is good practice to make a template to conform to the shape of the turning and a second template with which all spacings may be marked in a single operation. The latter is made by marking off on a straight stick which is a little longer than the leg, all measurements to be turned. The stick may be one-half inch thick and two to three inches wide. Brads are driven at the points of measurement and chisel-shaped points are filed on the ends of the brads. (Care must be taken to file all points to the same length.) After the legs have been roughly turned to the largest diameter called for, press the template, or marking gauge, against the revolving stick with sufficient force to mark all the spacings. This insures perfect work and saves time.

When it is desired to turn a large number of similar pieces, it is a good plan to make a diameter gauge. This is done by cutting notches in a stick to the exact size of the diameters required, and deep enough to pass the center of the piece to be turned. Such a gauge is far more efficient than the caliper.

A pattern should be made out of thin material for the stretcher of the stool. Trace the outline on the piece of wood which is to be used and saw to shape. A molding may be formed on the outer edge by the use of a scratch stock or a shaper.

Dowel construction is used in the making of this stool, because it is strong and is easily accomplished

by students. Dowel holes may be bored perfectly by any boy who is able to turn a brace and bit, provided he uses a dowel jig made for this purpose.

The frame for the top is made by cutting the short rails to the exact length. Cut the long rails an inch longer than the net length. Clamp the frame temporarily and mark the centers for two dowels for each joint, on the face side of the frame. Square across the edges to be bored and gauge to center. Bore $\frac{3}{8}$ " holes $\frac{3}{4}$ " deep and countersink slightly. Dowels that have spiral grooves cut in them, or those that have been driven thru a dowel plate having fine teeth are the best to use. (These dowels hold glue better than the smooth ones.) The frame should now be assembled to see that all joints fit perfectly, and then marked off for the rabbet that is to receive the cane. If woven cane is used, a groove must be cut to receive the reed or spline. This may be done on a circular saw, or by hand, with the use of a Stanley Universal Plane. The frame may be glued next, and when sufficiently dry, may be squared and a molding cut, or scraped, around the edge. Cut the frame rails square and to the exact length. Lay out centers for dowels on rails and legs. Bore holes and countersink. Cut grooves for the top fasteners. Clean all parts before gluing. (Use glue sparingly and warm all parts before gluing.)

The stool is now ready for final assembling. First glue end rails and legs together. Glue the ends of the stretcher to the legs in the same operation. Next, glue the side rails and the center stretcher.

The caning may be done while the glue is setting. Cut the cane to the outer edges of the grooves and soak it in warm water about three minutes. Be careful not to soak it too long because over-soaking results in too great shrinkage, and may crack the cane or break the frame. Drive the cane into the groove with a wedge-shaped piece of wood, beginning in the center of the rails and working toward the outside. After one end has been firmly driven into place, begin in the center of the opposite end. Care must be exercised in driving the cane into the grooves at the sides to avoid stretching it out of shape. Drive the wedge alternately—first one side, then the other. The reed or spline may now be fitted into the groove, using a miter joint at the corners. Run the glue into the grooves from a new oil can, the spout of which has been cut down to permit the flow of hot glue. Drive the spline into place and be careful not to use glue on the spline. Trim the edges with a sharp knife and when dry, the cane will be stretched perfectly tight. Owing to the moisture of the glue, the spline will swell and keep the corner in place.

The top of the stool is fastened to the frame with S-shaped metal fasteners or with buttons made of wood.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

WILSON H. HENDERSON Milwaukee, Wis.
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EDITORIAL

HOW THE SCHOOLS MAY HELP.

FROM the numerous reports that come from all parts of the country, it is evident that the schools are anxious to be of the greatest possible service in this time of national peril and anxiety. Many school systems have already tendered the government their services and facilities in the production of certain war necessities and in the giving of certain types of training necessary for the tasks ahead. The government has already accepted such offers from some of the great private institutions and perhaps also from certain public school systems.

The attitude thus shown by our schools is a most commendable one. It should be and is a matter of pride that our schools have not only tendered their services but that they have been adjudged by the government capable of rendering efficient service in such a crisis. While all this is true, we desire to sound a note of caution. There may be danger that in our eagerness to do some striking things for immediate assistance, some of us may ignore some of the more commonplace but just as important duties. There may even be danger that in some places attempts to be of immediate service in this crisis may result in waste of material, waste of time, waste of opportunities for the boys and girls to get what would make them of infinitely greater service a little later. In the vast number of schools the impossibility of participation in the training and mechanical activities designed to aid in this crisis is apparent. In most cases, these urgent and important activities will be in safer and abler hands.

Therefore, in the average public school away from the great centers of population and industrial agencies, the large part of the business of the school now, as in the past, will be to give every boy and girl the fullest possible opportunity for growth, initiative, and power in the lines that by common consent have been called "the arts of peace." The arts of war are but the arts of peace diverted to other ends. One need not feel therefore that he is failing to aid his country, if perchance it falls to his lot to do the ordinary things that after all are so essential to human welfare and happiness. He must indeed not be a slacker, deliberately trying to avoid the sterner duties of citizenship by hiding behind its more agreeable obligations. But the average school will be doing a patriotic duty when it teaches the important lessons

of citizenship, loyalty, economy, thrift, efficiency, and gives as much as it may of the training that fits one to become a self-respecting, self-supporting member of society.

There are many lines of work in which the double purpose may be served. Many household arts departments have busied themselves with the making of bandages, surgical dressings, hospital garments, etc., for the Red Cross work in the hospitals. School machine shops especially in Europe have used parts of shells and other war necessities as class work. Where these things are possible they should by all means be done; but where such things are not possible, teachers must still feel that they have multitudes of tasks to do for the welfare and safety of the country. Work must be speeded up. Waste must be eliminated. A real businesslike atmosphere must pervade the whole field of industrial work. The best teaching in the history of our work must be done this year. Every stroke must count; every minute must be judiciously used; every penny must be wisely expended; and all the forces of the school must be unified and directed toward the highest possible efficiency.

RESTATEMENT OF PRINCIPLES NEEDED.

THERE is not a more important consideration for the teachers of the industrial arts than that of changing the emphasis, the character, and the defense of their work. These special lines of work do have splendid qualities that are indispensable in our scheme of education. They have had to fight their way to recognition. They seem now to be established, yet it has been discovered that some of the claims and some of the defenses have broken down, and consequently some of the ground must be fought over again.

In the past, entirely too much store was laid by the general qualities of the training, the claims being based largely upon the false doctrine of formal discipline. Such claims were too indefinite, too general. The teachers of the various lines of the industrial arts need now to reorganize and to restate their educational and pedagogical creeds. New demands are upon them. The question is being put squarely to them, "What is the purpose of your work?" This insistent question is being put by people who cannot be satisfied with general, evasive replies, especially regarding the work in the upper grades and in the high school. The enactment of the Smith-Hughes law emphasizes this very necessity. For those who feel that the federal money is not sufficient to cause a reorganization, it might be well to point out that the operation of this law will establish standards. While the local communities may not be so concerned about the financial aid, yet they will be mightily concerned about the *reasons why* certain kinds of work will bring federal aid, while work that seems to them very similar *cannot* secure federal money. It is easy, therefore, to understand how the

standards and character and purpose of the special work in the schools will be vitally affected by the operation of this law, even tho the local community does not choose to come within its provisions.

It is an excellent time for each teacher of the industrial arts to make a very intimate and personal survey of conditions round about and to begin to adjust himself to the new movement of things.

THE SCHOOLS AND THE WAR.

THE American schools are now in the experimental stage of making education expressive of social activities and aspirations. There is general agreement that the experiment will be successful. As between control by discipline and initiative thru interest, the middle ground of interest and effort is having effect.

There is much school work presented indifferently because it is not well organized or is still controlled by the traditional idea of discipline.

The social crisis which is now at hand will help prove or disprove our schools as effective. The young people of our country are called upon to show their abilities as citizens of a great nation on short notice and at a formative period in their lives. Their response has been prompt and the indications are that they will render excellent service considering the experimental stage of their education.

Modern war demands many kinds of service. Many of these kinds of service have been taught experimentally in our schools. No one realizes better than the teacher that the training which these gallant young volunteers have had is inadequate and that they must now prove their worth to the nation. It is creditable to our schools that the youth of our land are able to respond to the demand for the various kinds of service required in modern warfare and it is even a greater credit that they do respond.

DR. PROSSER'S APPOINTMENT.

TEACHERS and others interested in the progress of vocational education will be gratified by the appointment of C. A. Prosser to the position of National Director of Vocational Education which was made by the Federal Board created by the Smith-Hughes law. Altho the appointment is for only six months, as the offer of permanent appointment was refused by Dr. Prosser, it is hoped that at the end of this period he may be persuaded to modify this decision.

His appointment will not come as a surprise to those familiar with the qualifications of Dr. Prosser. In fact it has been generally conceded that he is the logical man for the position and the one man in the country fully equipped to undertake the colossal task of initiating plans and policies for the administration of the law. His training and experience could not have been better adapted to fit him for this undertaking if they had been carefully pre-arranged with that definite purpose in view.

His years of service as a teacher and later as a superintendent of a city school system have given him an intimate knowledge of the needs of the public schools and sympathy with those administering them. His experience as Deputy Commissioner for Vocational Education in Massachusetts gave him an understanding of the problem of administering vocational education within the state. As Secretary of the National Society for the Promotion of Industrial Education he not only gained a wide acquaintance but those with whom he came in contact recognized in him a man of force, tact and ability, whose judgment can be relied upon. Thru his legal training and his contact with State Legislatures he learned how to write a law and how to adapt a law designed to accomplish a certain purpose to meet the peculiar conditions existing in various states. As a member of the Federal Commission of Vocational Education appointed by President Wilson, he had a large part in determining the provisions of the bill now known as the Smith-Hughes law. That his conception of vocational education is practical has been demonstrated in the rapid growth and success of the Dunwoody Institute in Minneapolis.

These professional qualifications together with a personality that makes not merely acquaintances but life-long friends, a dynamo of energy, a generous supply of good nature, and withal a vital interest in the progress of vocational education, pre-eminently fit Dr. Prosser for the great position to which he has been called.

PURPOSE.

TO desire and strive to be of some service to the world, to aim at doing something which shall really increase the happiness and welfare and virtue of mankind—this is a choice which is possible for all of us. To do some work that is needed, and to do it thoroly well; to make our toil count for something in adding to the sum total of what is actually profitable to humanity; to make our example count for something on the side of honesty, cheerfulness, courage, good faith and love—there is nothing beyond this, because there can be no higher practical result of effort. It is the translation of the true purpose of all the work and labor that is done beneath the sun, into one universal word: Usefulness. To have this for the chief aim in life ennobles and dignifies all that it touches.—*Henry Van Dyke.*

WE lose from our high schools the boys who are vitally interested in immediate money returns for their work. The main difference between this type of boy and the other is that these individuals develop this trait a little earlier; indeed, it sometimes means that they represent a class of individuals who feel more keenly the responsibilities of life than those who go along thoughtlessly accepting educational opportunities from the state and support from their parents as a natural part of their experience.—*Edwin R. Snyder, California.*

The Portland Convention of the N. E. A.

Of the nineteen departments of the N. E. A. which held sessions during the recent convention in Portland, Oregon, July 7-14, none was more successful or aroused more interest than that of the Department of Vocational Education and Practical Arts.

The convention in general proved to be a great patriotic rally, and while it was a failure in point of attendance, it proved to be an enormous success from the standpoint of timeliness and genuine interest. The addresses and discussions of the Department of Vocational Education were generally looked upon as most helpful and specific for the solution of the chief problems which the war has developed.

Mr. W. J. Bogan, Principal of the Lane Technical High School, Chicago, presided over the sessions and spoke briefly on the past work of the department and the outlook for the future. He emphasized the great importance of the work of the teacher of vocational and practical art subjects at all times as a factor in developing efficient citizens of a democracy. He placed particular stress on the demands of the nation at this time for a united effort on the part of all phases of educational activities to be directed toward the conservation of all our resources and the development of a more efficient school system.

L. W. Bartlett, Vocational Adviser, city schools, Pomona, Calif., spoke on the subject of "Vocational Guidance a Distinct Function of the Public School." Starting with the following aims as a basis, the speaker very clearly outlined and developed his conception of the subject: (1) to stimulate the vocation-motive as a direct force thruout the entire life of the pupil, (2) to give the pupil a grasp of the field of vocations, and the social and economic aspect of each, (3) to encourage the pupil to discover his powers and possibilities with a view to investing them, (4) to help him in the selection of a vocation, and in his choice of subjects in preparation for that vocation, (5) to assist him in making the start in life.

Mary Schenck Woolman, Manager National Association for Promotion of Industrial Education, Boston, Mass., followed with a splendid discussion of the topic "Training of Girls and Women for Trade and Industry." Mrs. Woolman put particular emphasis upon the social and economic conditions that have made it necessary for almost ten million women and girls to enter the industries. She spoke of the present conditions of life which make it necessary for women to work and on account of the war even heavier tasks than heretofore must fall to the lot of women.

To meet this demand it seems well to carry the training of women and girls further than in the past, whether they must work or not, with training for vocations which will enable them to know by experience what it means to earn a dollar, to make them all of greater civic service before marriage and in middle life when their families are grown to enable them again to enter the wage-earning or the social-betterment fields as skilled workers.

Extension of the Field of Home Economics in the School Curriculum was the topic chosen by Alice Ravenhill, formerly Lecturer on Hygiene, University of London, London, England. Miss Ravenhill argued in a most convincing manner for greater development along all the lines of practical education for the girls and women of our land.

An interesting open discussion followed, and many members of the section gave testimony as to the demands for the extension of vocational education.

The second session was opened by Mrs. Anna Y. Reed, of Seattle, Washington, who discussed the Problems of Organization and Administration of Vocational Guidance. Mrs. Reed analyzed the various cities which she had visited in recent years. Frank H. Shepherd, Associate Professor of Industrial Education, Oregon Agricultural College, Corvallis, Oregon, followed with an address on "The Training of Teachers for Vocational Schools."

The outstanding points made by Mr. Shepherd were: No teacher should be permitted to teach in a vocational school who has not had special training and practical experience in teaching.

The teacher in a vocational school should have broad education as well as trade skill or technic. No matter how skilled a workman may be, he should not be eligible to teach until he has also had preparation in the trade of teaching.

The educational system of the United States should be administered and supervised by the national government. A man trained in a vocational school should also be trained as an efficient citizen of a modern democracy so that each phase of his education will function in the development of a world wide democracy.

The discussions which followed the papers of Mrs. Reed and Professor Shepherd were perhaps the most profitable of the entire session and the audience of five hundred remained until the close.

Mr. Arthur H. Chamberlain presided over the final session and introduced Mr. Charles H. Jensen, Director of the Department of Mechanic Arts and Pre-vocational School, Stockton, California. Mr. Jensen took as the key-note the need of practical instruction in connection with manual training, and developed his paper along the line of his conception of industrializing the manual arts. The speaker enforced the thought that more must be added to our conception of manual training. The work must be vitalized so as to give the boys the elements of practical training for industrial life.

Arthur W. Dow, Professor of Fine Arts, Teachers College, Columbia University, New York, showed that art is practical as a school subject by describing the work they are doing in Teachers College.

One of the most interesting talks of the session was given by Mr. Ben W. Johnson, Director, Department of Manual and Industrial Education, Seattle, Washington, on the subject of The Relation of Art to Vocational Education and Manual Training.

The development of Homes in Urban Communities Thru Extension Work in Home Economics was the topic chosen by Mary F. Rausch, Assistant Professor of Home Economics, Extension Division, University of Washington, Seattle.

After an enthusiastic discussion of the different addresses, President Bogan took the chair and called the active members into a business session. The report of committee on nominations which submitted the names of the following persons as officers for the coming year was unanimously adopted:

President, Frank H. Shepherd, Associate Professor of Industrial Education, Oregon State Agricultural College, Corvallis, Ore.

First Vice-President, Arthur Wesley Dow, Professor of Fine Arts, Teachers College, Columbia University, New York.

Second Vice-President, Adelaide Steele Baylor, State Supervisor of Household Arts, Indianapolis, Ind.

Secretary, Lester W. Bartlett, Vocational Adviser of the city schools, Pomona, Cal.

INTERESTING EXPRESSIONS ON THE INDUSTRIAL ARTS AT PORTLAND.

Adaptation of Courses in Domestic Economy and Industrial Arts to Meet Existing Demands.

Our courses in domestic economy and industrial arts, then, should assuredly be greatly expanded to give us speedier, more complete and more widespread mastery of the production and utilization of the necessities of life. Where such courses do not exist in elementary and high schools, they should by some adequate means be introduced. Where already installed, their scope should be broadened if necessary by lengthening the school day. Vocational and continuation classes and special classes for adults, day and evening, should be organized at once for instruction along lines indicated. Credit for home work, in household arts, canning, gardening, and industrial service, and adequate supervision of such related activities ought to be provided in fuller measure.—*Supt. C. H. Dempsey, Haverhill, Mass.*

ART TEACHING IN THE NATION'S SERVICE.

A nation's art is part of a nation's wealth. We are seriously lacking in public appreciation of painting, sculpture, architecture and design, despite all that is being done to cultivate the fine arts.

Abroad the art teacher is a public officer. From Europe to the Far East we find Royal Colleges of Art, Government Art Schools and Cabinet Ministers of Fine Arts. Foreign educators give art teaching a high place. American educators have seemed largely indifferent to it, at least officially.

Americans individually are not insensible to the value of fine art as a national asset. When Rheims cathedral was shelled, when the ancient Gothic cities of France and Belgium were destroyed, America sent up a cry of protest.

What is it that we lose when these precious things go down under shell-fire? We lose, forever, a quality, the personal touch of the ancient artist. We can restore the form, but the living spirit, the art, is gone.

A nation that loses its treasures of beauty is made poorer.

A nation that produces great art sends forth power to all generations. France, Belgium, Italy, Greece, China, Japan, have drawn the world to them by their art.

Public appreciation of art in this country must be attained thru an art-teaching that goes beyond nature-copying the practical arts, and courses in art history.

It is possible to teach drawing, design and the practical arts without producing an atom of that quality which stirred your imagination before Rheims cathedral, or in the Antwerp gallery.

Art consists in excellence (of quality, not of technique) and the production of it depends upon exercise of powers written, not of collection of facts or acquirement of skill. Excellence can be measured only by the appreciations.

Excellence is not defined by use. A useful thing is not necessarily beautiful, as some claim.

To bring art-teaching fully into the nation's service it should be founded upon art-structure, as this is fundamental to all the arts whether called fine, applied, practical or industrial.

All visible art is a structure of lines, tones and colors, built up by choice and arrangement.

Experience in art-structure, carried on progressively, encourages individual expression, and develops appreciation.

School experience, thru art courses, in choosing the best ways of doing things, in working with a definite aim (as art requires) and in relying upon personal power, will affect home, environment, costume, and occupations. It will increase capacity for production and ability to create excellence. This must result in a better quality of industrial products, better city planning, better taste in dress and decoration, and the conservation of scenic beauty.

Such is the larger service that the art teacher can render to the nation.—*Prof. A. W. Dow, Columbia University.*

INDUSTRIALIZING THE INDUSTRIAL ARTS.

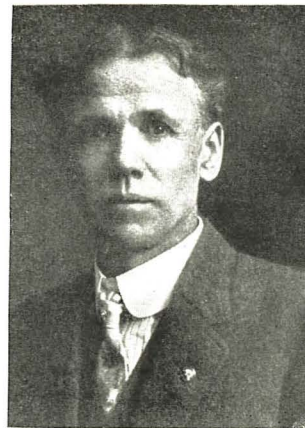
More must be added to our earlier conception and content of manual training. A newer conception must be developed which will vitalize the work and give the boys along with their manual training the elements of practical training for industrial pursuits.

Methodical doing has been one of the distinguishing ear-marks of manual training from the time we first began to work at our courses as a result of the Russian and Swedish practices. In spite of the fact that we must industrialize our manual training, we shall never realize our ideal unless we keep strictly in mind that methodical doing must ever and always be a vital consideration.

Students of education, and other authorities from the vocational and industrial standpoint, are unanimous in their plea for more time.

Our work in the High Fifth is designed primarily to develop initiative and pupils are given freedom in choosing so that they may make what they like.

It has been our experience that boys come to the high school without knowing the names of more than one or two of the tools which have to be used, and have no idea of their material value. A study of stains also should be made and every boy should have a simple vocabulary of woods. There is immense possibility for development along the lines of



PROF. FRANK H. SHEPHERD
President of the Department of Vocational Education
Practical Arts N. E. A.

concrete pottery. Every school should have a print shop, which will do more with less effort to teach written English, spelling, punctuation, and construction than anything I know. The aim of electrical work in the schools is to enrich the pupils' idea of electricity in modern life; to acquaint him with the parts of simple motors and their functions, and chiefly to furnish elementary experience in hunting electrical trouble, etc.

Deeds are needed more than words. Accept the fact that we are at war, and for the sake of manhood realize that for every man on the firing line several efficient men are needed at home. Preach, teach, and live industrial efficiency which to be genuine includes conservation and economy.—*George Henry Jensen, Stockton, Cal.*

WHY VOCATIONAL EDUCATION.

Vocational education is a step forward in democracy, for rightly given, it leads to efficient self-directed industry. Democracy is not real, however, until everyone has his chance in life. A child is a dynamo of energy when his interest is aroused, as one can see when watching him at a game he has invented. The problem of the school is how to get hold of the latent energy and direct it into worth while channels. "Education is teaching a fellow to work or it is no good." The ranks of the unemployed are filled with those who have had no training for wage earning and who have drifted from job to job until becoming weary of the dull round of work followed by slack seasons without occupation, gradually gave up all effort. Everyone has his niche in which he may become an asset and not a liability. Vocational education finds this ability, trains it, places the worker in a position where he can use it, and follows him up to see if his chance has come, or to show him how to get it.

The youth of the nation feel the urge to participate in active life. Some leave school on account of the economic conditions of the family; many go because the school has ceased to attract. Only one-half of the boys and girls who enter the elementary school remain to graduate and 85 per cent of them leave before they are 16 years of age. If they go to work they crowd into the unskilled trades and find difficulty in getting ahead. Employers complain of them, not only because they lack skill but because they have not the qualities which make for success. If they do not work, they crowd the streets, frequent the cheap amusements and soon the home sees that they are no longer of use to it.

The Smith-Hughes Act for federal aid for vocational education will this year begin to give money to train the boys and girls of the nation for vocational life. The urge of war conditions makes it necessary to use every resource of the nation, and the need of boys and girls in military or civil service makes a special demand upon us at present to develop vocational education in cities and rural communities that our vast number of young people may be able to give sufficient help to the country.—*Mary Schenck Woolman, Boston.*

WAR SERVICE OF THE BRITISH SCHOOLS.

The determination of the school authorities of New York City to render intelligent war service has brought forth some interesting information on the character of the work done by the schools of Great Britain. At a meeting held in July, in the office of Supt. William H. Maxwell, a letter was read from Sir Robert Blair, chief executive officer of the Committee on Education of the London County Council, relating the remarkable uses to which the school system of Great Britain had been put. After telling of the rapid increase in the number of children it was necessary to feed as a result of disturbed economic conditions at the outbreak of the war, Sir Robert explained in his letter how this difficulty was overcome by the school authorities. Following this, the schools turned to the relief of Great Britain's allies.

Clothed Refugee Children.

"A general organization of staff and teachers, formed to provide boots and clothing for certain Belgian and Serbian children, secured the fullest sympathy and co-operation of teachers and pupils," he wrote, "and in a few months the schools were able to furnish ten thousand complete kits made to pattern, color and size supplied by the two embassies.

"As there were tens of thousands of soldiers grouped within the near neighborhood of London," he continued, "an arrangement was made with the War Office for the teaching of French. With the same instructional object in view one of our technical institutes carried thru a series of classes in map reading for men of the Guards.

"One of the most important efforts for private soldiers was made in the summer recess of 1915 when 264 of the domestic economy organizing staff volunteered to forfeit part of their holidays to help in the work of training 2,500 soldiers to cook for the privates in the field. The War Office drew men from different units from all over England, brought them to London in two great groups of 1,000 to 1,500 each, and paid us 33 cents a day for the upkeep of the men. The soldiers were billeted in the school buildings and the preparation of their food formed the basis of the cookery instruction. Each group was taken for ten days.

"Our organization provided training classes for women for clerical occupations, for railways, for banks, for shipping offices, and so on. Our operations lasted for but a short time. The need was so great that it had to be met immediately either by trained workers or by untrained. In the few short months that we organized these training classes something like 1,500 women were trained, chiefly for clerical occupations.

Technical Schools Busy.

"Most of all our technical institutions formed connections with Government arsenals and got various kinds of munitions to make. The immediate demand was for gauges

for shell making, mostly inspection gauges, some workshop gauges. Our technical institutes were at first very diffident about undertaking this work, the standard of skill required being so high, but after a few appeals at each institution a little organization with one or two highly skilled men, assisted by less skilled, was got together, the machines were 'tuned up' and in a short time the manufacture of gauges began.

"The technical schools have in this way not only done a great national service, but they have, which is of the utmost importance to their future, acquired the confidence of the manufacturer. We have turned out approximately fifty thousand inspection gauges. In addition to manufacturing it was necessary to train semi-skilled workers for the munition factories, and in the two years we have trained, certificated and placed six thousand workers, the larger part being women.

"One institution has done a great deal of work in training more than one thousand men belonging to the Royal Field Artillery, Royal Engineers and the Army Service Corps in cold shoeing. At another institution more than 3,500 students were trained for Red Cross work. Also sixteen thousand recruits were obtained for the skilled sections of the Royal Flying Corps, and men have been trained for tinsmith and coppersmith working and in connection with wireless telegraphy.

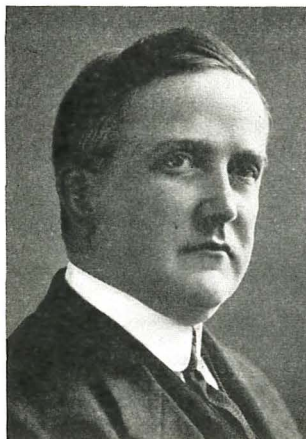
"A third institution took on the general direction of the preparation of synthetic drugs in the chemical department of the technical institutes and the medical organization of the army was largely indebted to these chemical departments for the production of the much needed drugs.

"There is a variety of other ways in which the highly expert skill of the staff of the technical institutes has been of service to the War Office, the Admiralty and the Ministry of Munitions. The staff have assisted as members of advisory boards or as actual directors of work. Even in a minor way a good deal of work has been accomplished in connection with optical instruments and generally with the manufacture of all kinds of munitions."

The Massachusetts State Board of Education has addressed Secretary of War Newton D. Baker, suggesting possibilities for closer co-operation between the government and technical schools. It is planned to use such schools as centers for the intensive training of enlisted men in the lines of engineering, mechanics, machinework and electricity.

The summer session of the Oregon Agricultural College closed July 31. Despite the unfavorable conditions due to the war the registration was exactly the same as in 1916. The manual arts department, under the direction of Prof. Frank H. Shepherd, enrolled 74 persons. Mr. George F. Buxton conducted the classes.

The New Federal Board of Vocational Education.



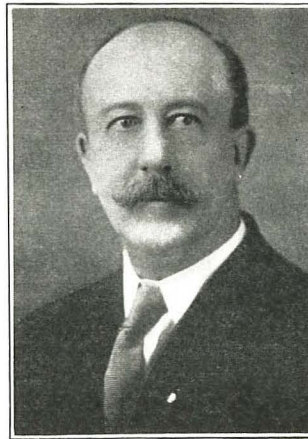
DR. C. A. PROSSER,
National Director of Vocational
Education.

Dr. Prosser was secretary of the National Society for the Promotion of Industrial Education and recently director of Dunwoody Institute, Minneapolis.



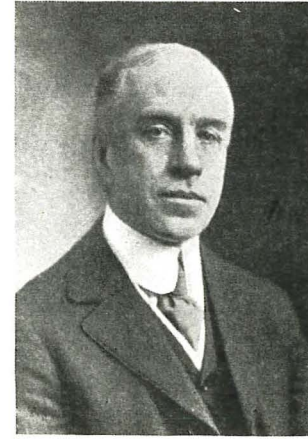
HON. CHAS. A. GREATHOUSE,
Member.

Mr. Greathouse is the agricultural representative on the board. He was formerly superintendent of public instruction for Indiana.



HON. A. E. HOLDER,
Member.

Mr. Holder, who is secretary of the board, is the labor representative on the board.



HON. JAS. P. MUNROE,
Member.

Mr. Munroe has been prominent as a leader among manufacturers for industrial education.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

MAGAZINE STAND.

L. Day Perry, Supervisor Manual Training, Joliet, Ill.

The magazine stand, illustrated herewith by drawing, sketch and photograph, is a project for eighth-grade boys of ability in woodwork. This stand is very effective if made of American walnut finished with oil and waxed, and cane panels left natural. The panels may be either hand caned or of commercial cane webbing. Hand caning will increase the labor on such a stand about fifty per cent, and perhaps would not prove as satisfactory as the inserted cane panel. The caned stretcher adds a distinct note to the structure which a plain stretcher of wood will not give. The sketch on the drawing suggests hand caning, while the photograph shows commercial cane. Either may be utilized at the option of the worker.

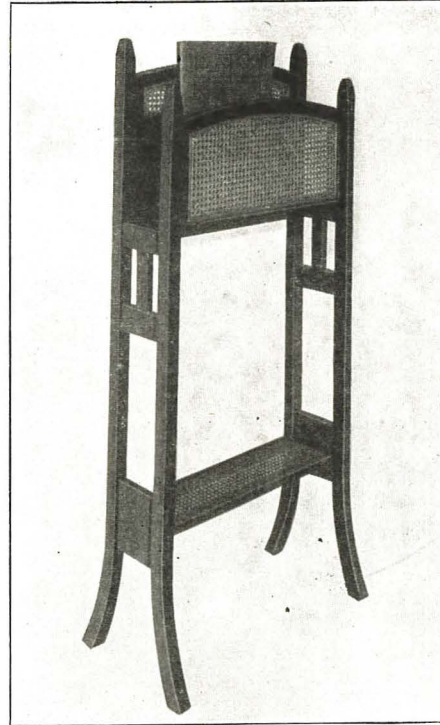
Construction is by means of the dowel joint with the exception of the tapered center division piece. This is screwed on from underneath with flat head screws, countersunk. This may be doweled if desired.

This particular stand was constructed by George Wattling, a pupil in the eighth grade. It represents a very high type of construction. Several stands similar in general line have been made by eighth-grade boys, but these used no medium in combination with the wood.

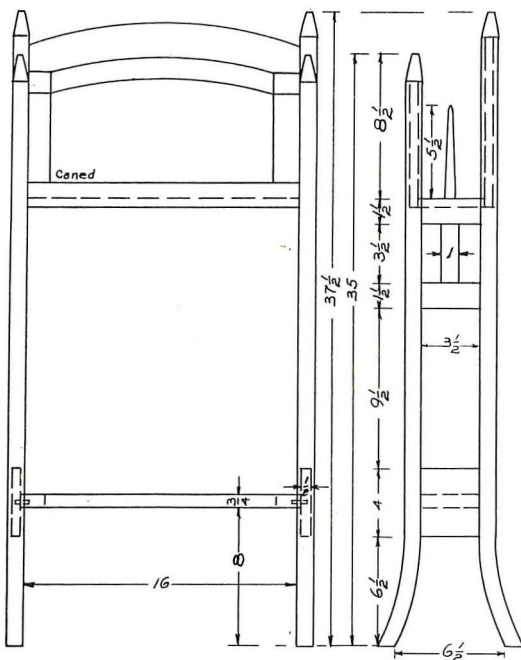
HUNTING AXE PROBLEM AS FORGED IN
HIBBING SCHOOLS.

J. F. Knowlton, Instructor.

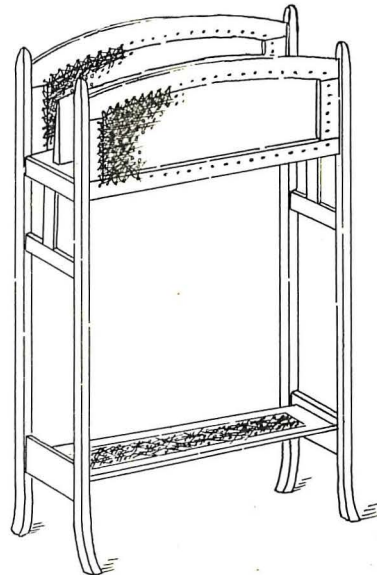
There perhaps is no problem in the blacksmith line that a school boy likes as well as he does the axe. It not only is an interest holder and reviver but it has several good points as a project. The punching of the eye gives a new problem in hot punching and a new use of the drift. The drawing



MAGAZINE STAND.

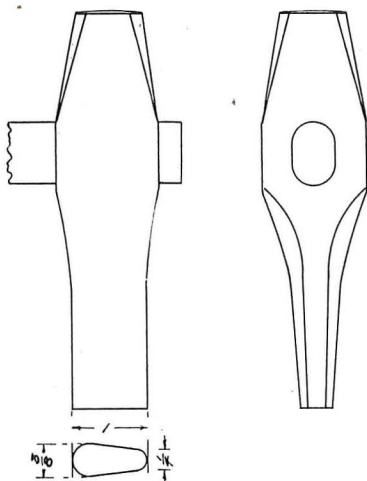


MAGAZINE STAND



and shaping of the axe also requires a great deal of skill, while above all the tempering is the most important. Then a lesson can be taught in hanging the axe on the handle. The problems can be handled by eighth-grade boys with success but, of course, it works better in the first year high and upper grades.

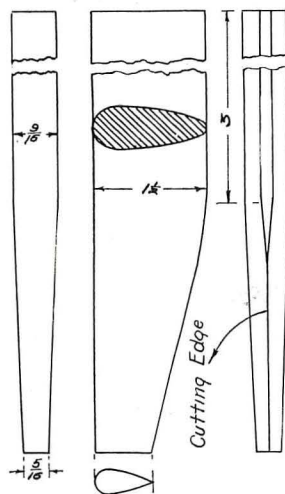
FIG. NO. 1
PUNCH FOR AXE EYE.



The stock to be used is 1x2 Carhan tool steel and in a bar the length of which can be easily handled.

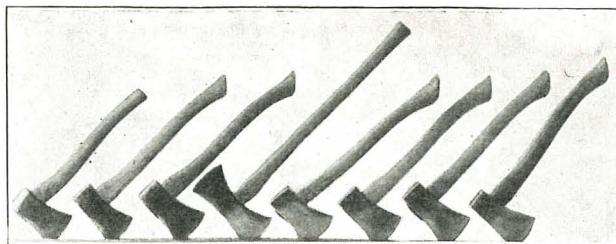
First measure back from the end of the bar $2\frac{1}{2}$ inches and square a line around the bar. Now center punch on the 1" sides on the line and directly in the center of the stock. Your work is now ready for punching. The punch should be a handled punch and shaped like the drawing Fig. 1. A round

FIG. NO. 2.
DRIFT FOR SHAPING EYE



punch takes out too much stock in one place and does not give room for the drift to work. Now heat for punching, being careful not to overheat, and punch the eye, starting from the center punch mark and finishing from the opposite center mark, the narrow edge of the punch being at the end to be used for the blade. The stock for the blade being $2\frac{1}{2}$ " long. Take great care to see that the eye is punched directly in the center of the stock.

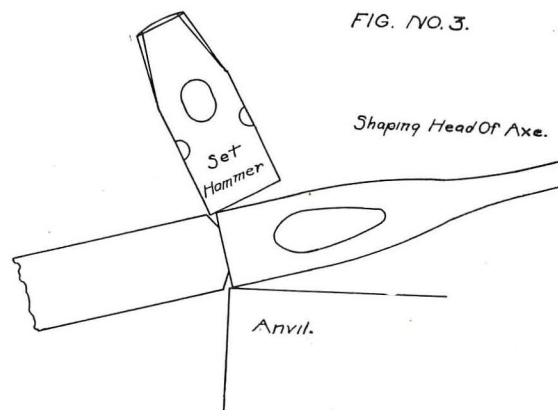
Next use the drift, which is forged from tool steel to dimensions shown in Fig. 2, to start the shape of the eye, using care to start the cutting edge of drift in center of stock, but such shape should not be finished until the axe has been drawn to nearly its correct shape. This is important as it overcomes the cold shut or check that is likely to start at the bottom of the eye. After the drift has been started from both sides and driven far enough so it will support the eye, the blade can then be drawn out either under the power hammer or



Hunting Axes made by the Author's Students.

with the sledge. As the blade works out the drift may be driven a little more, as this takes up the space made by the eye stretching. This operation is continued until the blade has been drawn to thickness and the eye worked to full shape as shown in the general drawing.

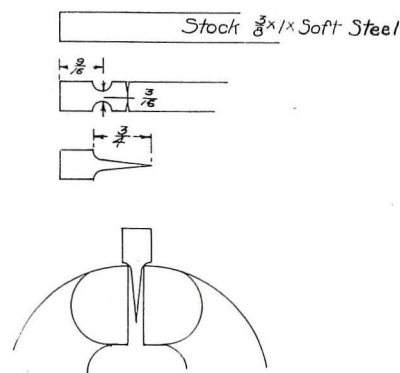
Now the length of the axe may be determined and partly cut off from the bar with the hot cutter. The head is now



shaped as shown in Fig. 3. The blade should now be trimmed to shape with a hot cutter and the axe forged with a hand hammer to as nearly the correct shape and size as possible, when it is cut from the bar and annealed by heating to a red and placing in a tank of air slack lime until cooled.

The axe should now be trimmed on the emery wheel, after which the curved lines shown in the blade of the axe

FIG. NO. 4
SHOWING METHOD OF FORGING WEDGE



in the general drawing are drawn with chalk and the shape worked down with a coarse file. It is now roughed out on the coarse buffing wheel and finished to a medium polish on the finer ones. The axe is now ready to temper.

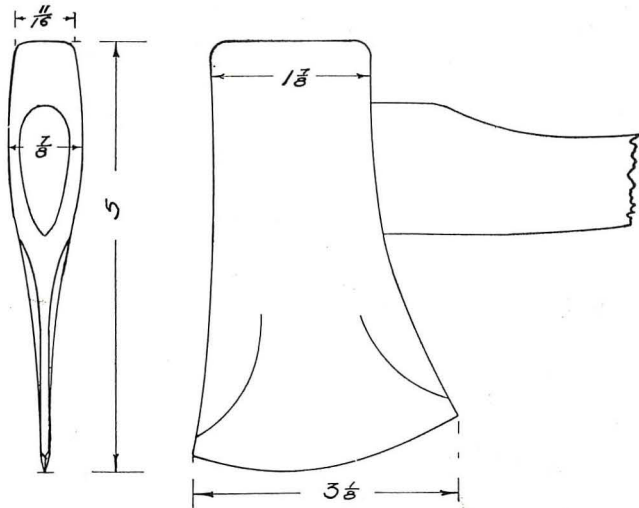
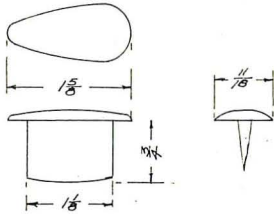
The tempering can be done in a number of different ways, but I will explain the method used by the boys, which gives very good results but perhaps is not the best method but the easiest control. The difference in the grade of steel makes a difference in tempering, and each grade of steel calls for a certain heat and color. This will have to be worked out for the particular grade of steel being used.

The axe is now heated to a tempering heat in a large coke fire without draught and when it is the correct heat all over it is taken out by the aid of an iron hook placed in the

eye (do not use tongs) and quenched in a tank of water that has had the chill taken off. It is now drawn between two bars of iron or one bar bent into a "U" shape until the proper colors are obtained, which are, for the blade, $\frac{2}{3}$ black, dark purple, the eye, no temper; and the head blue.

The checking of the axe while tempering I have found is very often due to forging at a too high heat, quenching in ice cold water, handling while heating for tempering with

FIG. NO. 5
STEEL COVER WEDGE



Dimensions of Axe Described.

tongs, and not having an even heat. The only sure way to avoid checks is to use a furnace and not an open fire.

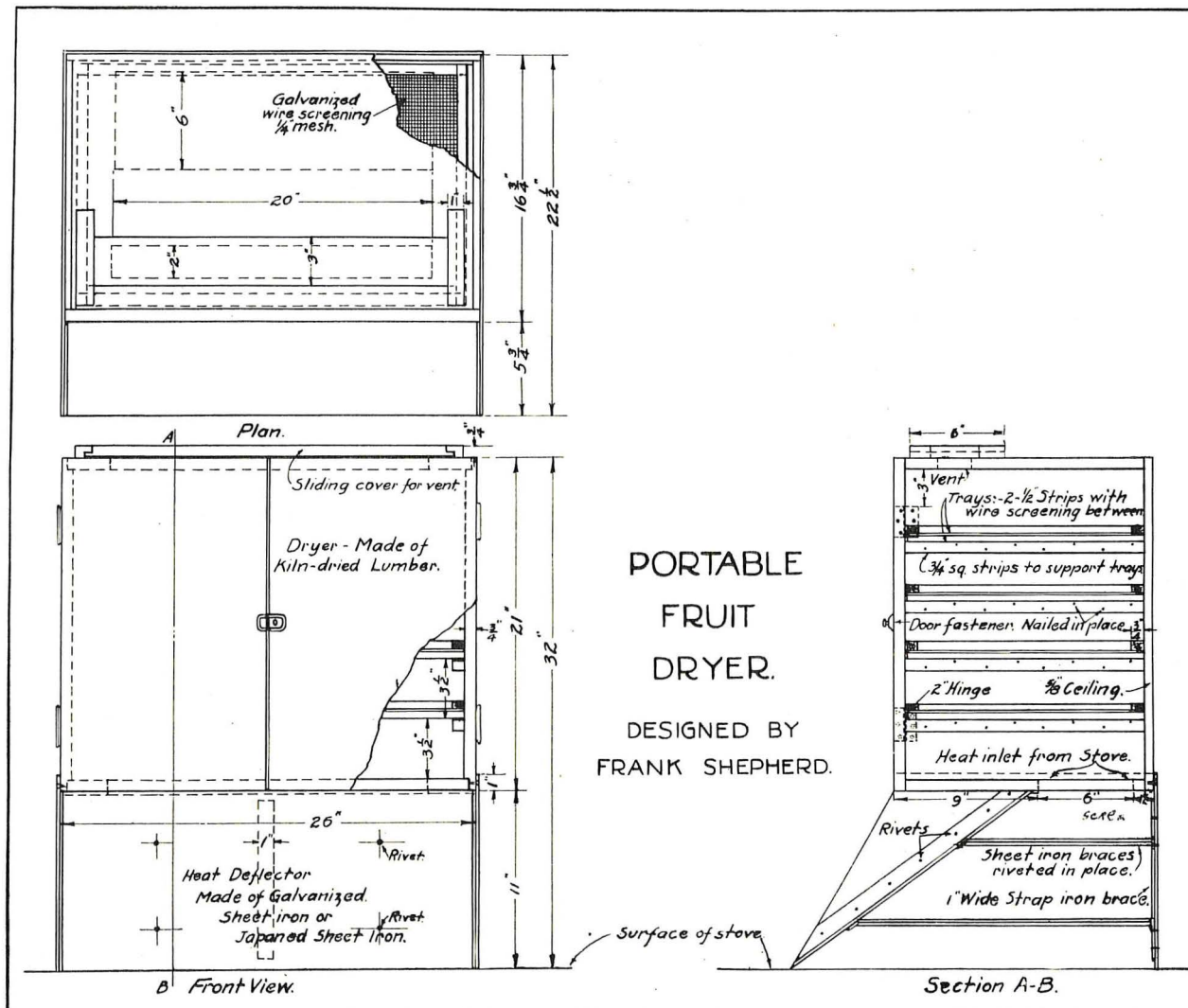
The axe is now polished and is ready for the handle. After hanging the axe the metal cover wedge may then be made. This is a wedge fastened to a cover which when driven into place not only acts as a wedge but also covers the end of the handle. The forging of this wedge is shown in Fig. 4, and is self-explanatory. The head of the wedge is upset in the vise as shown. It is now filed to size and shape as shown in Fig. 5. The head of the wedge is now polished and driven in as a wedge by use of a copper hammer.

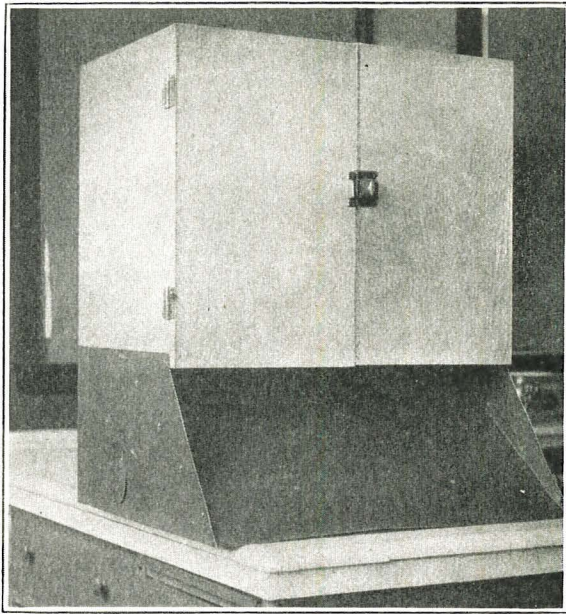
A HOME DRYER FOR FRUIT.

Frank H. Shepherd, Associate Professor of Industrial Arts, Corvallis, Oregon.

This fruit dryer was designed in response to a request from schools thruout the State of Oregon for a simple home dryer that can be made by the boys in the manual training shops. It has been tried out both for its practical utility in the home, and for its value as a school project.

As a problem for the manual training boy it embodies important principles in both woodworking and sheet metal





HOME FRUIT DRYER.

work. Under the woodwork it involves some cabinet-making, hanging of doors, putting on hinges, etc. In the sheet-metal work it involves bending, punching, riveting, etc.

Each dryer is an individual problem in that it must be designed and made for the kitchen range on which it is to be used. The one illustrated was made for the writer's range. Every boy who undertakes to make the project must design it for the stove in his own home. Supposing a boy had in his home a range with a warming oven on top. He would then have to arrange the heating deflector so that it would be turned toward the back of the range under the warming oven. The drying box would be turned the other way, and the door would be located in the side or the end of the dryer to correspond with the turning of the deflector.

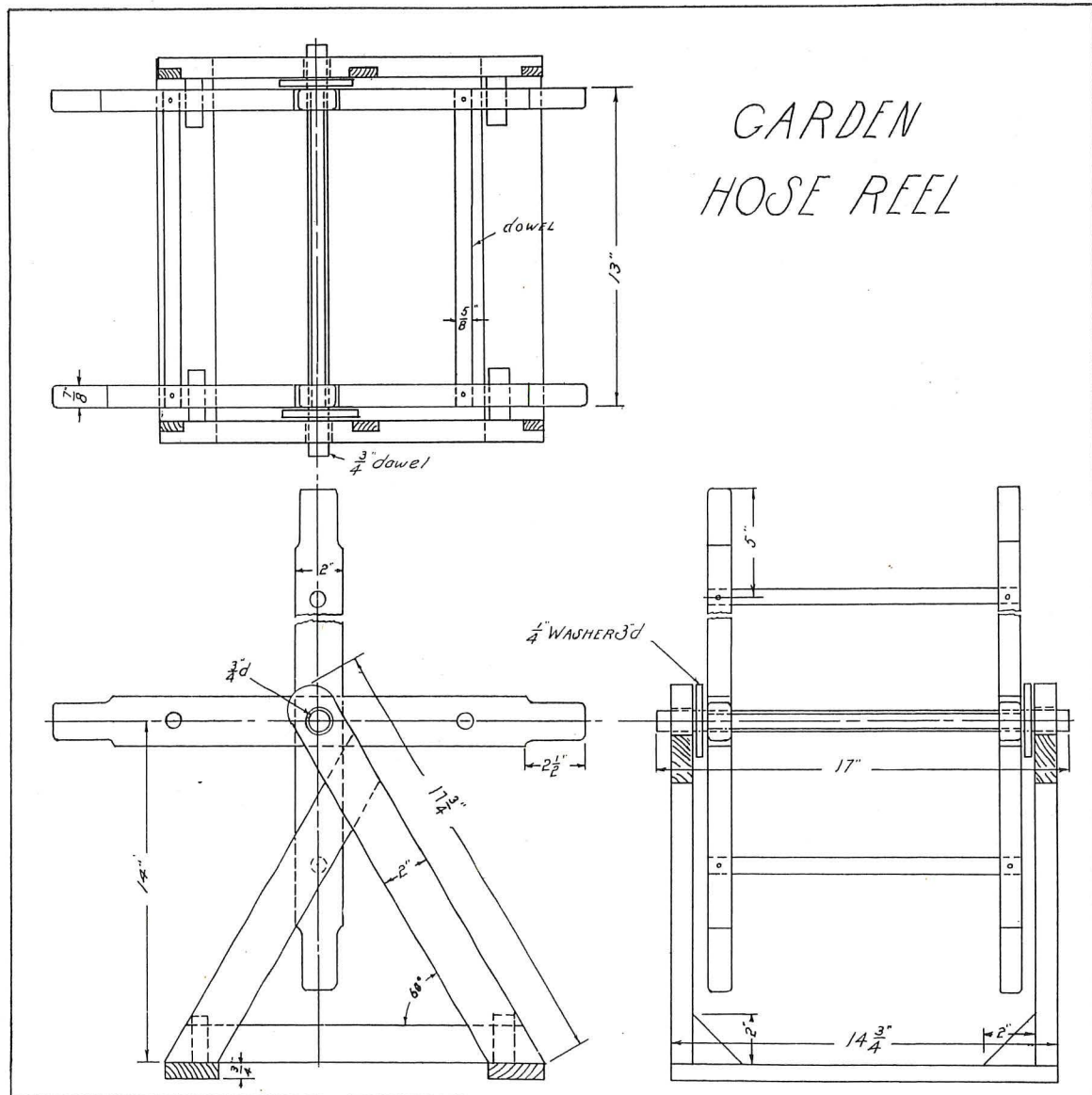
A HOSE REEL.

Francis E. Mack, Trenton, N. J.

The accompanying drawing shows a project suitable for the eighth grade. It is not too difficult, but involves the use of the neglected bevel in the layout of the sixty-degree miter lap joints.

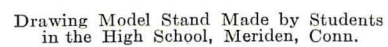
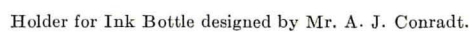
The hose reel is particularly apt at this time, when we are all engaged in home gardening, as it eliminates a lot of waste time in handling the hose, and it also teaches the youngsters to take care of it.

A census taken of two hundred boys showed that practically all had a garden hose at home, and less than ten



Detail of Garden Hose Reel designed by Mr. Mack.

THE HINGED BOARD ON TOP IS HELD UPRIGHT BY TWO SMALL HOOKS ON BACK EDGE OF TOP.



per cent had reels. Nearly every boy wanted to make one, as it is practical, useful, and inexpensive.

Note that the holes bored thru the brackets are $\frac{1}{8}$ " larger than the shaft to allow for swelling; also note that $1\frac{1}{2}$ " finishing nails are used on the $\frac{3}{8}$ " dowels to keep them from slipping out of the holes. A good coat of paint or spar varnish should be applied.

DRAWING MODEL STAND.

Leslie G. Martin.

This stand or pedestal is designed for use in freehand drawing classes in schools where there are no special facilities for this work.

The stand may be placed between the aisles and the models placed upon it. There is a hinged upright on the back edge of top on which models such as flowers, etc., may be held with thumb-tacks, or it may be covered with material to make a suitable background for models standing on the horizontal top.

The stand is constructed of white-wood. The two pieces at the top and bottom are glued together and then fastened with screws from the under side. The post is mortised in these pieces and a saw cut made in each end of post, in which a wedge is driven after it is glued to prevent the post pulling out in case the glue dried out. The small blocks on each corner of the base are glued on and fastened with screws. The two boards at the top and base are fastened together with the grain running in opposite directions to prevent warping. The hinged upright also has a strip set in across the grain to prevent warping.

The stand is finished with two coats of white shellac over a dark brown stain, then sanded and waxed.

The freshman high school class has completed an order of 45 stands for use in the grammar schools of the city.

HOLDER FOR INK BOTTLE.

A. J. Conradt, Jr., New Providence, Pa.

This little drafting room kink is a valuable ink saver and forestalls many an unsightly blot from materializing. It presents an interesting project for the lathe, involving face plate and chuck turning. Best results are obtained by using a hard, close-grained wood such as maple. The holder is designed to remain stationary but can be made portable by screwing on a circular wood base $\frac{1}{4}$ " in thickness. In either case the bottle may be removed and replaced by a new one or it may be refilled while in the holder.

ART EDUCATION IN PITTSBURGH.

Art education is needed today as never before in the history of the country. The present call is for more practical art education which will fit the student for work in the industries, and for appreciating art in the homes. In this connection, Dr. J. W. Beatty, of the Carnegie Institute, Pittsburgh, Pa., gives a brief but interesting report on the art work done by students of the public schools in the classes held at the Institute. He mentions briefly the significance of the work, the scope of the training and the results which are to be expected.

Dr. Beatty writes:

"A very noteworthy work in the field of art education was that carried on during the year thru the public school system of Pittsburgh. This school work was begun by the Carnegie Institute in 1901, and, with the co-operation of the school authorities, has been carried on continuously since that year, excepting only during a brief interruption while the construction of the enlarged institute building was in progress. This year Dr. William M. Davidson, Superintendent of Public Schools, and Mr. C. Valentine Kirby, Director of Art, have co-operated with the Department of Fine Arts, and they have sent in systematic order all the students of the eighth grade to the institute for instruction in art, making a total attendance of about 5,000. This instruction has been made a part of the school work of the year.

"The significance of this work lies in the fact that the eighth-grade students who are about to enter the high school or upon the active duties and work of life eagerly seek instruction and the opportunity to acquire some knowledge with reference to art and its appreciation. The time these

students are permitted to give to this study in the last year of their public school work is unfortunately limited. For this reason it is our purpose in this work to teach the appreciation of art solely by explaining in a simple way the essential qualities possessed by all good works of art. The eighth-grade students of the public schools are not art students in the ordinary sense, and therefore technical information is not as important to them as a simple explanation of the most important qualities to be sought for and appreciated in works of art. In brief, my purpose has been to concentrate the attention of these non-professional students upon the fundamental, underlying qualities in art, to the end that they may, without confusion, take away one or two principles upon which to think and from which they may learn appreciation alone.

"The task here set is not an easy one. The difficulty of explaining or defining the few simple qualities upon which works of art are chiefly dependent for their beauty and life is one met by all artists in their intercourse with laymen. The question why this or that picture which seems to possess much merit, especially in detail, is not a good picture is heard more frequently than is any other question. To define the subtle qualities that belong to all good works of art and to rivet the attention of the students upon these qualities, even tho it be but for a comparatively brief time, is the purpose of the lessons prepared for this work."

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of the inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Printers' Magazines.

689. Q.—Will you please give me the address of one of several good printers' periodicals?—R. S.

A.—The American Printer, New York City, semi-monthly, \$3.00 per year.

The Inland Printer, monthly, Chicago, \$3.00 per year.

The Printing Art, Boston, Mass., monthly, \$3.00 per year.

History of Toolmaking.

692. Q.—I am trying to prepare a few short classroom lectures for high school work on industrial history—the evolution of the more common tools and materials.—E. R. B.

A.—Some information may be gathered from standard encyclopedias and from the files of leading trade papers. The American Machinist has published a number of articles on the history of certain tools. The Hardware Age has contained some articles and various furniture and building magazines have printed articles. The following references will be helpful:

English and American Tool Builders. Joseph W. Roe. Yale University Press, New Haven, Conn.

American Toolmaking. Joseph V. Woodworth. N. W. Henley Publishing Co., New York.

Practical Tool-Maker and Designer. Herbert S. Wilson. Henry Carey Baird & Co., Philadelphia, Pa.

Industrial Biography. Smiles. Boston.

Mr. Arthur F. Payne, formerly Assistant Professor of Manual Arts at Bradley Institute, and more recently connected with Pratt Institute, Brooklyn, has been elected Director of Vocational Education at Johnstown, Pa. Mr. Payne will have full charge of the manual arts and domestic arts departments of the schools and will be entrusted with the organization of a vocational department, continuation schools and the prevocational work in the new Garyized Junior and Senior high schools. Mr. Payne entered upon his new work on August 1, and conducted during the month a survey of the school industrial situation in Johnstown. The board of education has purchased a large building in which the shops of the several vocational and prevocational departments will be housed.